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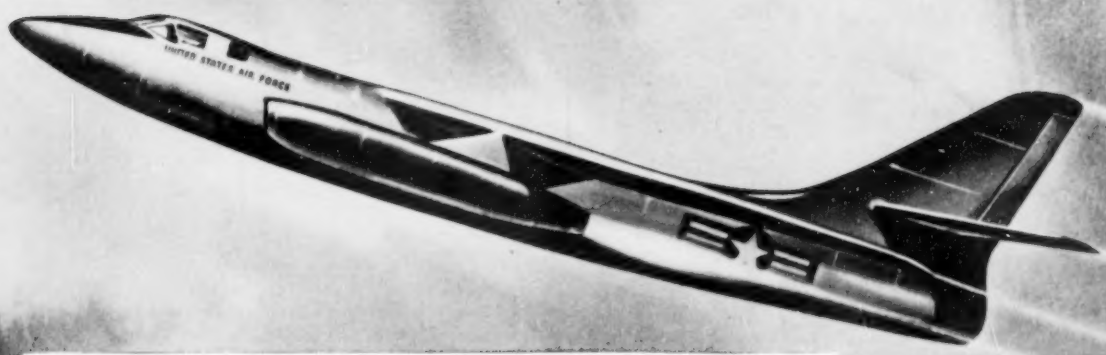

AIR FORCE'S NEWEST MEDIUM BOMBER

Here's the RB-66, Douglas' new twin jet bomber which will be rolling off the line this year at the Douglas Long Beach, California, plant. It will carry a crew of three and is designed to be an extremely high performance aircraft capable of speeds in the 600-700 miles per hour range.

It's a source of considerable satisfaction to us at Honeywell that the Air Force and Douglas selected the remarkably sensitive E-11 Autopilot for the job of making flight on the RB-66 easier and more precise. It's a further source of satisfaction that the Honeywell electronic fuel measurement system, standard equipment on more than 40 types of military and commercial aircraft, was also chosen to provide accurate, dependable fuel measurement so vital to increased aircraft utility.

The E-11 Autopilot and electronic fuel measurement system are but two of the many aeronautical control devices designed by Honeywell, which are proving themselves again and again in the service of military and commercial aviation.

Nowhere else are aeronautical controls engineered to surpass specifications by such a generous margin, or is the emphasis so much on *quality of product.*

We fully expect to continue in this tradition to develop more and better control equipment. Because automatic controls are essential to aviation progress. And automatic control is Honeywell's business.

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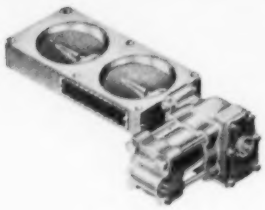

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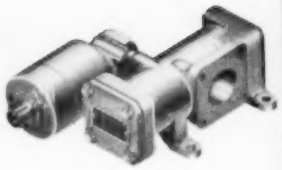

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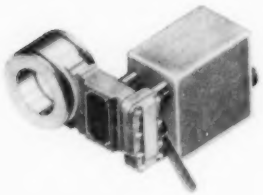

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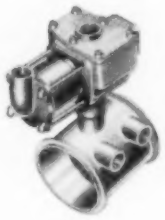

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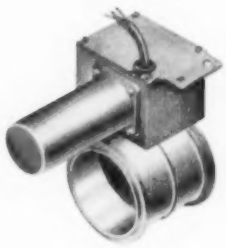
Hydro-Aire Hot-Air Valves cover Three Basic Categories: Butterfly Valves, Jet Valves, Pilot Valves. Motor operated, Pneumatically operated, Motor operated and Solenoid controlled. Duct sizes—one inch to six inches. Duct air temperatures ranging from minus 65° C. up to 150° C. Ambient temperatures ranging from minus 65° C. up to 250 C. A very wide range of operating pressures.



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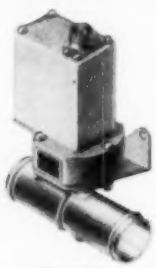

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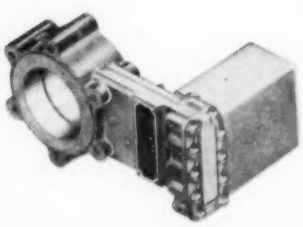

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Smoother bank and turn... quicker ground care

FAST MILITARY PLANES could fly more efficiently in banking and turning if the air gap between aileron and wing were sealed off. A coated fabric seal would work . . . but led to other problems. It took so many screws to fasten the seal tight that repair was a headache. Yet the seal had to be removable.

Here was one problem that B. F. Goodrich engineers solved with a pat, ready-made solution. Their famous Pressure-Sealing Zippers had been proved in even tougher sealing service. Overlapping rubber lips provide a 100% seal against air pressure. This is just what was needed on the aileron. And it saves time on the ground—with a zip, the mechanic can expose the aileron. If a *new* aileron is installed, the new and old halves of the zipper mesh perfectly. No more hours of taking out screws, putting in screws!

B. F. Goodrich Pressure-Sealing Zippers fit snugly around complex shapes. They can be cemented onto either fabric or metal. They save space and weight. They have been used on airplane doors, air ducts, inverter covers and for watertight protective coverings.

The Boeing B-47, illustrated, is just one airplane to equip ailerons and elevators with B. F. Goodrich pressure-sealing zipper seals. Others include the Convair B-36, Lockheed P2V.

Other BFG products for aviation include tires, wheels and brakes; heated rubber; De-Icers; Avtrim; Plastilock adhesives; inflatable seals; fuel cells; Rivnuts; accessories. *The B. F. Goodrich Co., Aeronautical Division, Akron, Ohio.*

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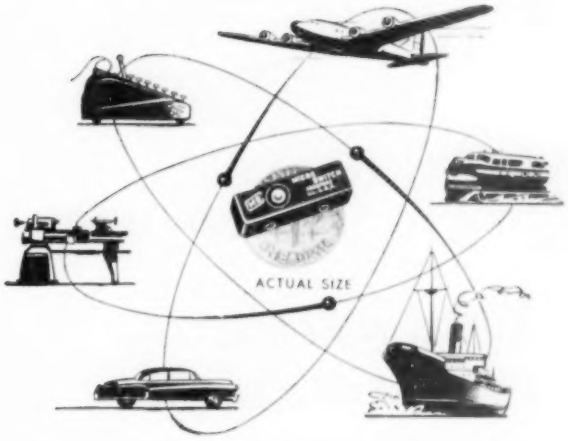
Better Products Thru Better Design

how highly precise, small size, lightweight MICRO Switches enable design engineers to achieve better design in a multitude of products



IT IS significant that more and more design engineers are accepting the fact that "the use of MICRO switches is a principle of good design."

In their constant striving to create "better products thru better design," it is quite natural and logical that they should utilize the application advantages of these versatile switches.

Being so highly precise, they are "naturals" when minute movement with very small actuating force is a "must." Being small in size, they fit into tight corners where more cumbersome components cannot be used. And being light in weight (some weigh only 1/15 of an ounce, and are about a dime's diameter in length), they are well-nigh perfect companions for magnesium and other weight-saving metals and alloys.

In addition, they can be supplied in over 6000 different combinations of housings, actuators and electrical characteristics. All this is indicative of the multitude of products in which they have influenced design procedures.

For instance:

* * * *

The remarkable growth of vending machines, from the penny gum dispenser to those which serve hot coffee with cream and sugar to taste, is an excellent example of the contribution of MICRO to better product design. Prior to MICRO'S developments, there were no components that were uniformly sensitive; that possessed sufficient electrical capacity; and that were properly protected against dust, moisture and other conditions, as well as protecting the owner. MICRO has contributed much to the design and development of coin-operated machines and has been an important factor in the growth of this important industry.

* * * *

The perfection of a device for counting paper money was a long, difficult and costly undertaking. Not until the precise operation, small movement differential and accurate repeat performance of MICRO switch were employed did the device prove dependable, for the use of MICRO switch made it possible always to detect the presence of more than a single bill as the paper money passed through the counter. MICRO'S development of a proper switch was the perfect solution. Successful use by many banks and financial institutions verifies the dependability of the device.

* * * *

Successful design of the popular garbage disposal unit, which shreds and carries off food waste at the turn of a faucet, hinged upon finding a switch of extremely small size, capable of operation in this unusual environment, and sensitive enough to operate by the low force of running water. The perfect answer lay in a MICRO switch which, when the water is turned on, closes the electrical circuit and starts the motor powering the shredding mechanism. The result—a better product through better design.

* * * *

So, time after time, not only in the design of new products but in the redesign of existing products, design engineers have proved and continue to prove that the "use of MICRO switches is a principle of better design."

MICRO

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WHO'S WHERE

In the Front Office

Sam D. Irwin has been elected a vice president of Curtiss-Wright Corp., heading the Wood-Ridge, N. J., company's Export Division.

J. P. Donald Garges has been elected vice president and general manager of East Coast Aeronautics, Inc., Pelham, N. Y.

Bert C. Goss and **Kerryn King** have been named senior vice presidents of Hill and Knowlton, Inc., New York.

Henry S. Elder is the new executive vice president of Titeflex, Inc., Newark, N. J. Also promoted recently by the aircraft accessory manufacturer are **George K. Licht**, vice president in charge of production, and **John J. Phillips**, vice president for engineering and sales.

Leo S. Sullivan has been appointed vice president of Automotive and Aero Sales Division, Russell Manufacturing Co., Middletown, Conn.

M. A. Travis, former plant engineer at American Propeller Corp., has been named a vice president of Rack Engineering Co., Connellsville, Pa.

Robert H. Wharton has been appointed assistant to the president of Delta Air Lines.

Changes

Pierre Desautels has been promoted to overseas director of Trans World Airlines.

Richard W. Porter is general manager of General Electric's recently organized guided missiles department, Schenectady, N. Y., and **Fred B. Law** has been named to head GE's new aircraft products department, Johnson City, N. Y.

Curtis L. Bates has joined Ryan Aeronautical Co., San Diego, as assistant director of engineering.

Fletcher G. Bennett has been appointed maintenance manager of Pan American World Airways' Latin American Division. Other PAA changes include **Richard M. Adams**, superintendent of the Brownsville, Tex., base; **Bernard W. Lorenz**, chief pilot-navigator of the Pacific-Alaska Division, and **William F. Raven**, assistant to the Latin American Division manager.

Honors and Elections

J. H. Carmichael, president of Capital Airlines, has been reappointed to the industry consulting committee of the National Advisory Committee for Aeronautics.

Profs. Clark B. Millikan, Hans W. Liepmann, Frank E. Marble and **Ernest E. Sechler**, all of the California Institute of Technology faculty, have been reappointed to the National Advisory Committee for Aeronautics. Named to NACA's special subcommittee on rocket engines was **Dr. A. J. Stosick**, division chief of the institute's jet propulsion laboratory.

John B. Clark, industrial relations director at Northrop Aircraft, has been elected chairman of the industrial relations committee of Aircraft Industries Assn.

INDUSTRY OBSERVER

►Largest employment of aircraft in atomic weapons maneuevers is now going on in the Caribbean at Vieques, Puerto Rico, where the Marine Corps is using helicopters, transports and jet fighter-bombers in an amphibious assault using simulated atom bombs as offensive weapons. Marines believe vertical envelopment of a hostile beachhead by helicopter assault can be successful with offensive or defensive atomic weapons.

►Air Materiel Command headquarters is becoming concerned over the increased volume of investigative reports indicating kickbacks or fee arrangements between employes of Air Force prime and subcontractors. Official warnings on the provisions of Public Law 319, Section 51, Title 41, prohibiting fees, commissions or gratuities to prime contractor employes from the subcontractors on government contracts, have been sent by AMC to the aircraft industry.

►Douglas C-118A formerly used as the Presidential transport "Independence" is being overhauled at Santa Monica and will be returned to USAF soon where it will be used as the Chief of Staff's personal transport.

►Lockheed Constellation now used as President Eisenhower's personal transport is a Model 749 formerly used by USAF Secretary Finletter. Before its USAF service, the plane was used by Lockheed Aircraft Service Corp. to maintain communications with Keflavik Airport in Iceland. LAS operated the Iceland field for some time under military contract.

►Boeing has delivered the last of its famous Superfort piston-engine-powered bombers. Total of 4,250 B-29 and B-50 bombers were built by Boeing and its licensees during the last 10 years. Last Superfort delivered was a TB-50H, bombardier-navigator-radar operator trainer.

►De Havilland has resumed flight testing of its DH-110 night fighter for the first time since a prototype crashed at the 1952 SBAC Farnborough show, killing test pilot John Derry, his observer and 30 spectators.

►Vickers V-1000 jet transport is planned in two versions: a domestic version of 180,000 lb. maximum gross; and an international version with 220,000 lb. gross weight. Initial powerplants will be 9,500-lb.-thrust Conways with an increase to 11,500 lb. thrust planned for later versions of this Rolls by-pass engine. Airframe is being designed to accommodate engines delivering up to 15,000 lb. thrust and will incorporate leading edge auxiliary wing tanks similar to those on the Comet 3 to get a 3,000-mi. range.

►Boeing eight-jet YB-52 is back in the plant for modifications at Seattle while the XB-52 sister ship continues to log flight time. Indications are that the total B-52 flight test program is well ahead of the comparable XB-47 flight test program in 1947.

►Trouble with an auto-feathering arming switch on the American Airlines' Convair which made a safe emergency landing at Floyd Bennett Field, N. Y., recently was a factor in the feathering difficulties the airplane experienced. A three-position switch guard was used with a two-position on-off switch. Result was that pilot turned the switch on when he thought it was turning off, and vice-versa, according to engineers analyzing the accident. The airplane was flown to American Airlines base at Tulsa for a complete rewiring job on the propeller circuits. Original cause of indicated loss of power in the left engine, which resulted in pilot hitting the feathering switch the first time, has not been located. Nor has the misfit switch guard installation been explained.

►Hughes Aircraft is now testing a new device that will link the radar-computer directly with control surface actuating mechanisms on the North American F-86D and enable the aircraft to track down its targets automatically, using the human pilot only as a monitor of the system. The Lockheed F-94C also was designed to perform target interception automatically.

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March 9, 1953

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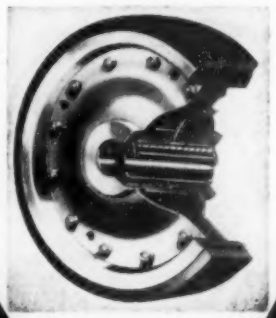


NEWS DIGEST

Domestic

Slick Airways DC-6A set a new nonstop coast-to-coast speed record for airfreight last week, flying 2,575 mi. from Los Angeles to New York in 7 hr., 45 min. at an average speed of 331 mph. The transport carried 27,000 lb. of miscellaneous cargo.

Roger Lewis, sales manager for Curtiss-Wright Corp., was expected last week to be nominated for the remaining post as Assistant AF Secretary.

Air Force Secretary Harold Talbott is expected to return early this week to Washington after a quick trip to Korea to receive a briefing from USAF field commanders on the combat situation preparatory to facing Congress on the AF budget for fiscal 1954.

Boeing C-97 modification as a hospital transport is being started by Temco Aircraft Corp. at its Greenville, Tex., overhaul division, with a production order for conversion of a large fleet of C-97s to air evacuation configuration expected to follow the prototype. In Dallas, Temco is converting single-engine Navion planes into twin-engine, four-place executive aircraft under a $1.9-million contract with Riley Aviation Manufacturing, Ft. Lauderdale, Fla.

Piasecki's YH-21A Work Horse is undergoing tests at temperatures of −65 deg. in a refrigerated hangar at Eglin Air Force Base, Fla. The copter is scheduled to be tested by Air Rescue Service under actual polar conditions in the Arctic.

More than 9,000 workers are employed by Fairchild Aircraft Division in its Hagerstown, Md., plants, exceeding the World War II, peak of 8,250.

Edward M. Seay, 53, assistant to the vice president of American Airlines, died Feb. 25 in his New York home.

Los Angeles International Airport has asked the Secretary of Treasury to designate it as a federal airport of entry, arguing that most foreign flights now must bypass Los Angeles or obtain special permission to land.

Corporation Aircraft Owners Assn. board of directors may change the organization's name at its next meeting to Association of Business Aircraft.

Earl H. Ortman, famed test pilot and several times competitor for the National Air Races Thompson Trophy, died at Miami, Fla., Feb. 27 of a heart ailment.

COAXIAL HELICOPTER developed by Gyrodyne Co. of America is pictured during Navy flight tests, recently completed at the company's St. James, N. Y., heliport. It is the first coaxial copter to pass such military specification. Navy says data on more than a year of tests will be made available to the Air Force and Army.

Delos W. Rentzel, former Civil Aeronautics Board chairman, has organized the Texas Auto Transport Co. in Oklahoma City. He is president of the new firm.

Standard Aircraft Equipment Co., Mineola, N. Y., received a Civil Aeronautics Board certificate last week to repair all types of plane instruments and accessories, believed to be the first full-coverage permit granted in the New York area under CAB's new repair station regulation.

Inter-airline receivables billed last January through airlines clearing house in Washington totaled $33,455,305, a 26½% increase over the same period last year.

Aircraft shipments in January totaled 278 one-to 10-place personal and executive planes at an overall value of $2,763,000, Aircraft Industries Assn. of America reports.

Civil aircraft exports added up to 24 planes in January 1953, declining from last year's average of 30 units per month.

Financial

Curtiss-Wright Corp. Wood-Ridge, N. J., reports a net income for 1952 of $9,047,514 from military and commercial sales totaling $326,183,643, an increase of 85% over last year.

Colonial Airlines earned a net profit of $5,000 during the first month of this year.

Northwest Airlines showed a net loss last January of $326,946; operating expenses totaled $4,769,001, compared with total operating revenues of $4,003,105 and a tax adjustment credit of $354,200.

New York Airways, Flushing, N. Y., recently sold 88,050 shares of previously unissued stock for $1,100,625. The company had 226,550 shares of capital stock outstanding as of Jan. 31.

Swiss Airlines receipts in 1952 add up to approximately $15.8 million, according to the carrier's annual report.

International

Sizable growth in a worldwide air traffic last year is reflected in a total of $218,240,000 in transactions put through International Air Traffic Assn's clearing house in London—a 28% increase over 1951, IATA reports.

Construction of a new delta-wing jet fighter, designed by Avro Canada for speeds up to 1,300 mph., is being delayed while the Canadian government decides whether to invest $105 million in a prototype and production of the aircraft.

Flying staff car

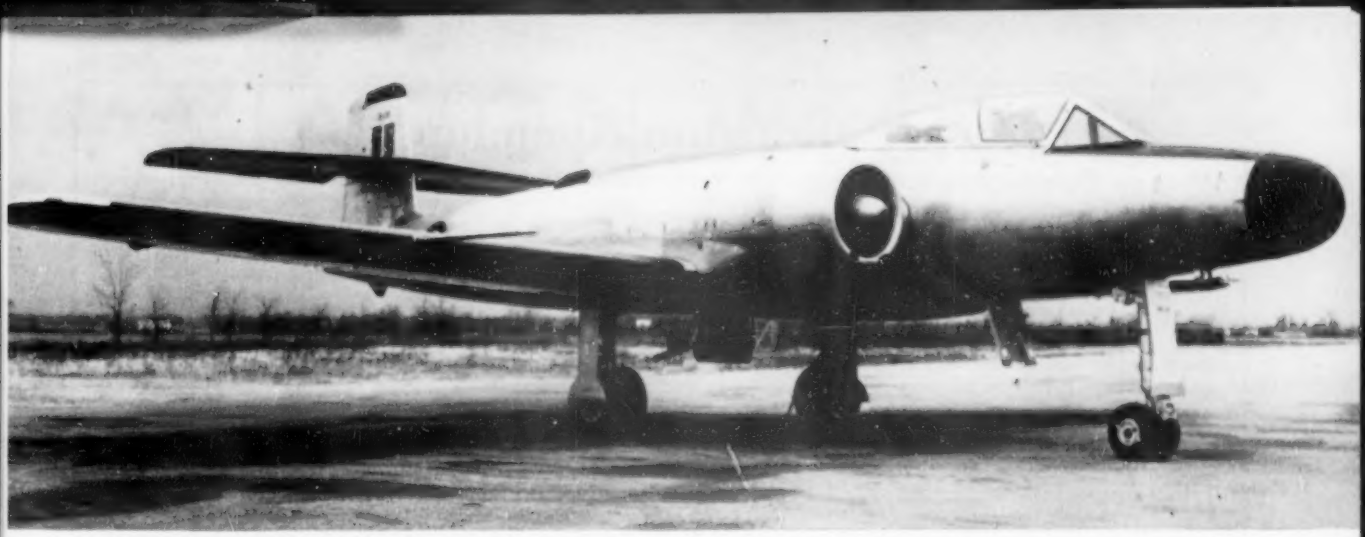
This rugged twin-engine Beechcraft operated by the Army Ground Forces carries six, has a top speed of over 200 mph and a range of 1155 miles. It delivers the versatile, exceptionally dependable performance characteristic of Beech planes.

With Army designation L-23A, it is a modification of the brilliantly engineered Beech Twin-Bonanza. The L-23A is one of many Beech military planes now in production.

Beech Aircraft Corp., Wichita, Kansas, U.S.A.

Beechcraft

HELPING AMERICA BUILD FASTER



LATEST VERSION OF CF-100—An early production Avro Canada CF-100 two-place all-weather fighter in the new Mk. 4 configuration with blunt nose housing improved radar. Production models will be all-rocket armed. Craft has been dived past Mach 1 in recent tests.

Foreign Aircraft News in Pictures

NEW FRENCH JET TRAINER—Morane-Saulnier M.S. 755 (above) made its first flight Jan. 29 near Paris. Featuring a T-tail, the craft seats two side-by-side and is powered by two Turbomeca Marbore 2 jets of 880 lb. thrust each. Gross weight is approximately 6,000 lb.

FOUGA MAGISTER ALOFT—The C.M. 170R (below) two-place tandem French jet trainer features a large V-tail.

NEW SPANISH TRAINER—Iberavia I-115 (below) is all-wood and is powered by a 150-hp. engine. Top speed is 142 mph.

Washington Roundup

Money Developments

Funds for Air Force and Naval Aviation for the coming 1954 fiscal year face a rough road in Congress, according to indications so far.

• **Chairman John Taber** of House Appropriations Committee, leading advocate of steep cuts, has taken a firm hold on the reins of his committee. Without consulting members, he has hired a staff of 50 to 75 investigators and accounting experts to make cut recommendations. Their identity and activities are being kept secret, even from some committee members. But it is understood many have been assigned to the defense budget. Max Monro, retired general manager of Aeroproducts Division of General Motors, is understood to be one of the experts retained by Taber.

• **Chairman Dewey Short,** with the support of his Armed Services Committee, is ready to hold the line against too-deep slashes in defense funds anticipated from Appropriations Committee. Short commented: "Defense, the biggest item in the federal budget, is going to have to take its share of cuts under the Republican economy program. But we must use a scalpel and not an ax. I don't see how Truman's $41-billion defense budget can possibly be cut below $35 billion, and that is probably too much. Our present goals, including a 143-wing Air Force, must not be reduced."

• **Secretary of Defense Charles Wilson** generally is expected to support new funds proposed by former President Truman's budget. It was drawn under the direction of Assistant Secretary W. J. McNeil, whom Wilson has retained on his team. Truman requested new funds for USAF and Naval aircraft and related procurement of $8.9 billion, compared with this year's $16.6 billion.

• **Undersecretary Roger Kyes** is making reviews to determine the advisability of further stretchouts in military programs. These might lead to recommendations for a reduction in the $9-billion expenditure for aircraft procurement the Truman budget contemplated. Argument of USAF and Navy against stretchouts is that they increase unit costs and delay achievement of necessary combat strength.

• **Democratic Rep. George Mahon,** former chairman of the Appropriations Subcommittee on Defense, also indicated that the military budget faces political skirmishes. Pointing out that 60% of every military dollar goes to procurement, he contended in a floor speech that the new defense command should cut costs by tightening up on contract provisions and profits to business. He said:

"Too often in the past timid lieutenant colonels and underpaid civilians have been going out and matching their wits with big business, and the taxpayer has paid the penalty of increased costs. . . . If (the Wilson regime) will, whenever necessary, crack the heads of big business, shave down the profits to big manufacturers and forget any allegiance they may have had to business colleagues who remain out of government, the prospects for good management and cheaper defense costs should be bright."

Raising the Curtain

First break-through in the wall of silence at Defense Department since the new administration took over Jan. 20 will be a press conference by Secretary Wilson this week or next.

• Wilson is inclined to follow the example of the President and Secretary of State and hold regular weekly conferences to keep the public informed and keep public support for defense activities. But, as a minimum, he has indicated he will hold conferences on alternate weeks.

• Wilson also has taken the position that the service secretaries should have a wide rein in expressing policy for their departments, even if it might be at odds with overall policy.

• Secretary for Air Harold Talbott plans to start weekly press conferences shortly.

• Secretary for Navy Robert Anderson doesn't plan conferences or other public expressions "for some time yet."

Subsidy Separation Law Out?

There's a strong move, supported by Air Transport Assn., to hold off consideration of legislation separating subsidy from airmail pay.

This is the three-point airline position as outlined in a memo circulated among congressmen:

• As in the past, the airlines continue to support "fair and equitable" subsidy separation legislation.

• But, since Civil Aeronautics Board has completed reports which show the amount of subsidy and the amount of mail compensation in total and by individual carriers, it is possible for both the executive branch of the government and the Congress to determine how much the airlines are being subsidized and how much they are being paid as service pay for the carriage of mail and "the basic objective of subsidy separation legislation has thus been achieved."

• "This being the case, action on subsidy separation bills should be deferred until it appears that the Board's reports do not adequately serve the purpose of subsidy separation."

Opposition comes from congressmen who want Congress to have the chance each year to knock out money for airline subsidy. Legislation of the type sponsored by Sen. John Kennedy and Rep. John Heselton would make this possible. But the consensus is that this is not legal under the present system in which subsidy is appropriated as "airmail pay."

Here and There

Senate Small Business Subcommittee has invited the Civil Aeronautics Board to a session Mar. 17 to ask Board members what they have done to keep nonskeds in business. Members of the subcommittee include Sens. Edward Thye (chairman), Robert Hendrickson, Charles Tobey, Lester Hunt, George Smathers. Tobey, Hunt and Smathers also are members of Senate Interstate Commerce Committee, with jurisdiction over commercial aviation.

Single regulatory agency, or abolition of CAB and assignment of airline regulation to Interstate Commerce Commission, seems to be definitely out. Among other developments: Erie Railroad and other railroads are breaking the long-time solid front of these lines in favor of the proposition.

User charges. A study outlining government-financed facilities for all types of transportation—roads, waterways, etc., as well as airways facilities—is due for submission to Congress shortly. It will recommend a general policy for assessing users of all types to reimburse the government expenditures. This is the approach that has been urged by the air transport industry which has objected to being singled out for assessments. —**Katherine Johnsen**

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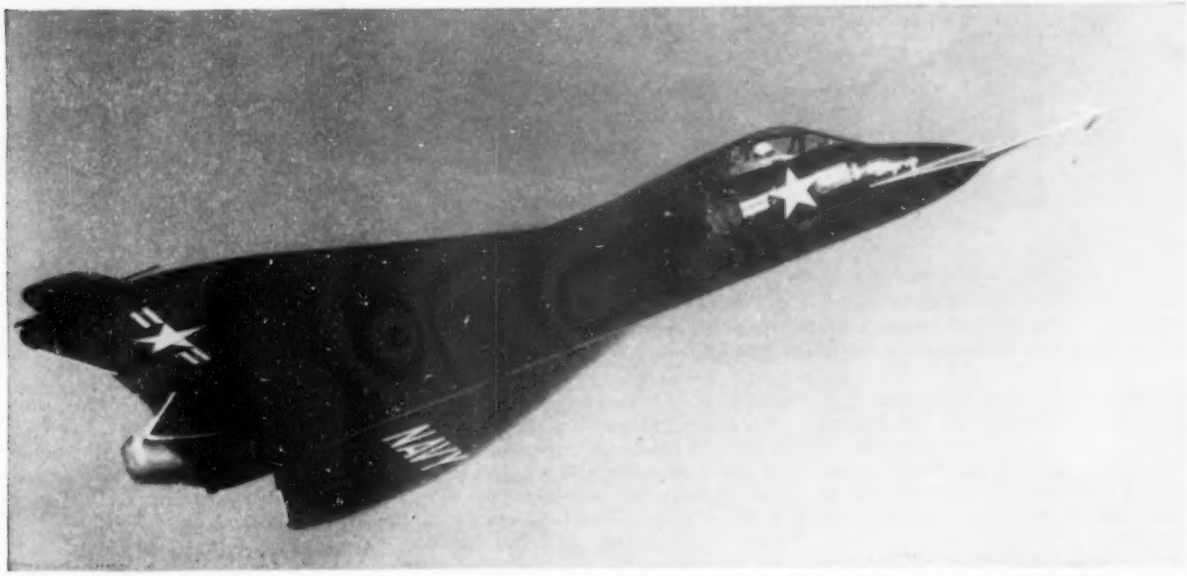


DOUGLAS XF4D-1 SKYRAY, seen in new flight views here and on page 14, is considered one of top carrier-based interceptors. It has been officially described as supersonic, yet novel wing features permit short landings and takeoffs. Aileron-elevon separation is visible.

Douglas Aircraft Backlog Tops $2 Billion

- **Record military and commercial plane production, sales and profits push net worth to all-time peak.**
- **Supersonic A4D attack bomber design is well advanced, and $1 million is spent for jet liner development.**

By Robert Hotz

A record postwar year in sales, profit and production was reported by the Douglas Aircraft Co., Inc., for its 1952 fiscal year ended last Nov. 30.

Net profit increased 63% to $10,792,285 for an earning of $8.99 per share, compared with $6,912,829 and $5.76 per share for 1951.

Sales increased by 132% to $522,619,409, compared to $225,173,226 for 1951.

Douglas entered 1953 with a record postwar backlog of orders and letters of intent of $2,055 million. This compares with its peak World War II backlog of $2.9 billion accumulated late in 1943.

Among new developments revealed in the annual report were:

- USAF has ordered sizable production of the sweptwing B-66 bomber at the Tulsa plant.
- New turboprop military transport (C-124X) is under development.
- Special Skyraiders (AD-4B) equipped to deliver "special weapons," believed to be small atomic bombs, are being produced at El Segundo.
- Design of a new supersonic Navy attack bomber (A4D) is well advanced on the El Segundo drafting boards.
- X-3 research plane is the "world's first man-carrying aircraft designed to take off under its own power and operate at sustained supersonic speeds in level flight."
- More than 11 million sq. ft. of plant area are now encompassed in the Douglas divisions.
- Net worth of Douglas reached an all-time high of $87,699,806 equivalent to $73.08 per share of stock.
- $1 million has been spent on developing a jet transport design.

Summarizing Douglas achievements for its 33rd year of operations, president Donald W. Douglas modestly noted that in "many respects the fiscal 1952 year was outstanding and highly satisfactory" and that "our products and position in the industry improved."

Entering 1953 Douglas had four operating divisions–Santa Monica, El Segundo and Long Beach in California and Tulsa, Okla.–producing 10 distinct models of military aircraft and three types of transports for the commercial airlines. About 13% of total Douglas sales for 1952 represented commercial business.

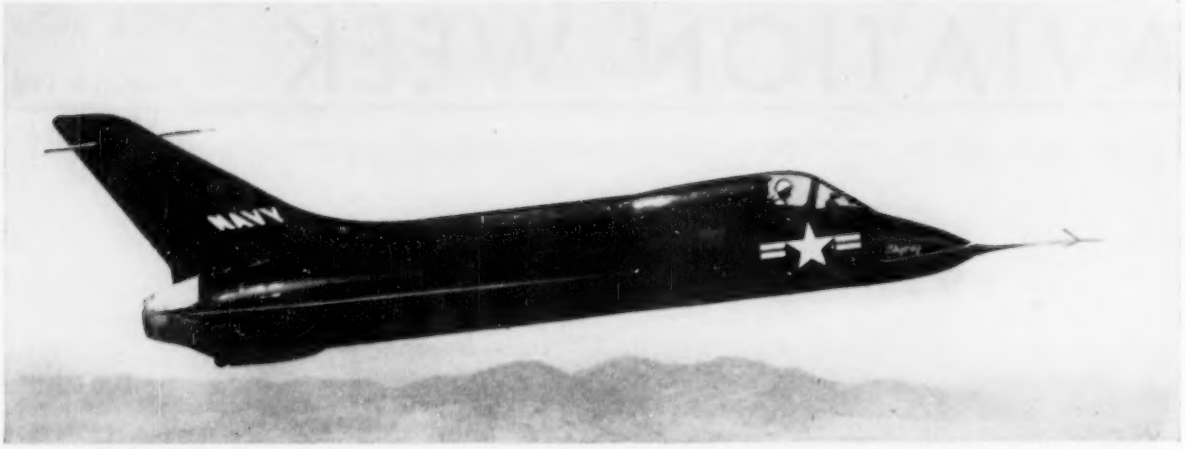
Douglas now has one of the most diversified production programs in the aircraft industry embracing USAF, Navy and commercial customers.

Here is the way 1953 production picture has developed:

▶ **El Segundo**–This division–with a production-engineering team headed by general manager T. E. Springer and chief engineer E. H. Heinemann–has produced a brilliant array of Naval aircraft. Production mainstay still is the rugged Skyraider series, which has reached the AD-6 modification–a "cleaned-up" version of the AD-4 also equipped with special gear for ground support work. Also in production is the AD-4B, a modification of the basic AD-4 equipped to carry "special weapons," a term generally used by the military to denote tactical "baby" atomic bombs. It is believed that some AD-4Bs are already in service aboard Navy's larger carriers.

During 1953, this division will prepare to put into production:

- F4D, a bat-winged fighter design that



SKYRAY INTERCEPTOR features a thin airfoil section. Powerplant is a Westinghouse J40-WE-6 of 7,000 lb. thrust, but more powerful J40-WE-8 with afterburner may also be fitted. Bulge under tail houses arrestor hook. Plane is slated for large-scale production.

already has exhibited sensational flight performance despite use of a lower-powered engine than originally planned. Indications are that the Navy is planning a production program for this aircraft that is relatively large by Navy standards.

• **A3D,** a sweptwing carrier-based twin-jet attack bomber. The A3D is scheduled to become the standard Navy jet attack bomber. Prototype now flying is powered by two Westinghouse early model J40 turbojets, but production models will use the Pratt & Whitney J57.

• **A2D,** a turboprop-powered carrier-based attack bomber. The Skyshark is intended to supplant the original Skyraider series as the standard light attack plane with the fleet.

▶ **Long Beach**—Here the team headed by James Simpson, general manager, and J. C. Buckwalter, chief engineer, is working on USAF projects. Current work includes:

• **Globemaster transport** series. During 1952, production of the D-124 series shifted from A to C models. The C-124 is powered by an improved version of the P&WA Wasp Major built by Ford, which delivers 3,800 hp. Development of the YC-124B, powered by four 5,500-hp. P&WA T34 turboprops, has reached the point where the prototype is 75% completed and is scheduled to fly late this year.

This division also is developing the C-124S, "an even further improved version constructed to take fullest advantage of the turboprop powerplant." The C-124S still is in preliminary design stage but will feature a completely pressurized fuselage and more powerful turboprops.

Douglas also is working on a much larger military transport aimed at carrying a 100,000-lb. payload.

• **B-66 bomber** series. This design, a modification according to USAF specifications of the basic A3D configuration, will be built in two versions: the RB-66 photo-reconnaissance plane and the B-66 light bomber. Production versions of the B-66 series will be powered by two Allison J71 turbojets of about 9,500 lb. thrust. The B-66 series is earmarked for service with the Tactical Air Command for use in ground support work.

▶ **Santa Monica**—L. A. Carter, general manager, and E. F. Burton, chief engineer, are concerned primarily with commercial transport production and development. This division delivered 59 DC-6B commercial transports during 1952, in addition to a quantity of USAF C-118 and Navy R6D versions of the same design. Production at Santa Monica was more than double the 1951 output and is scheduled for a further 53% increase in 1953 as deliveries of the DC-6A commercial airfreighter and the DC-7 Wright compound-engine airliner pick up momentum. Conversion of Navy R4D transports to Super DC-3 types also is continuing at the Santa Monica Division.

Initial delivery of the DC-7 is scheduled for this summer. Since the DC-6 series was introduced in 1946, Douglas has received 433 orders including 174 original DC-6 models, 27 DC-6A cargoliners, 174 DC-6Bs and 58 DC-7s. Contracts were signed with 15 airlines during 1952, calling for delivery of 114 commercial transports.

▶ **Tulsa**—This division, headed by general manager Harry Woodhead and chief engineer D. E. Dunlap, is concerned solely with modification and production of Boeing-designed B-47s. First Tulsa-built B-47 flew Dec. 12.

▶ **Guided Missiles**—Two models of guided missiles were in limited production at Douglas during 1952, representing 60% increase in activity in this field over 1951. Additional missile contracts were received from Army Ordnance, Navy and USAF, Western Electric, Sperry and General Electric. Douglas is working on 15 different missile projects, including a new type of surface-to-surface weapon on which, the report says, "It is believed security restrictions may soon be relaxed."

Air Force to Sell Excess Equipment

Air Force is cleaning house to dispose of all its excess equipment stored by Air Materiel Command at various warehouses throughout the country. Everything from hairpins to machine tools, and aircraft engines worth millions of dollars, will be disposed of soon.

Other armed services and federal agencies will get first crack at the miscellaneous property. That which remains after government agencies have surveyed the material will go on public sale. One of the first sales will be at Marietta, Ga., where 228 machine tools, which Air Force has stored at Government Aircraft Plant No. 6, will go on the auction block Mar. 31.

The tools are the remainder of 40,000 machine tools stored at Marietta and Omaha, Neb. following World War II and later rejected by Air Force contractors. They are obsolescent for future production and are not needed by any government agencies.

By disposing of its excess, Air Force will relieve the critical need for warehouse space. Surplus has built up since Air Force stopped all normal disposal at the outbreak of the Korean war in order to evaluate its combat needs.

Inspection of the available tools at Marietta may be made Mar. 16-27, prior to the public sale, by any prospective bidders.

Bid forms and machine lists will be available at the sale site or may be obtained by writing to U. S. Air Force, Plant Clearance Office, c/o the Tumpane Co., Inc., Government Aircraft Plant No. 6, Marietta, Ga.

New Aeronca

- **Company re-enters civil field with twin transport.**
- **And eight-place plane is slated for 1954 flight.**

Aeronca Aircraft Corp., Middletown, Ohio, is coming back into the civil airplane business with a new 306-mph. twin-engine pressurized-cabin executive transport, aimed at the rapidly growing business plane market.

Prototype of the new aircraft, designed for eight passengers plus a crew of two, is reported already under construction at Middletown, under supervision of veteran airplane designer George A. Page, now Aeronca director of engineering and research.

Sketches of the high-wing transport showing its close-to-ground loading arrangement and details of its specifications and estimated performance are already being circulated to business aircraft users.

Cole H. Morrow, chairman of the board of directors of Corporation Aircraft Owners Assn. and chief plant engineer of J. I. Case Co., Racine, Wis., considers the new Aeronca design one of the two most promising now being offered for future business plane use. The other is a four-engine executive plane design proposed by North American Aviation (AVIATION WEEK Mar. 2, p. 163).

▶ **Largest Yet**—Aeronca's new venture is the largest civil plane the company has built. Its previous original designs have been confined to one-place, two-place and four-place planes, mostly of steel-tube and fabric construction. However, Page's long experience in larger all-metal aircraft design and manufacture at Curtiss-Wright Corp., in St. Louis and Columbus, Ohio, has been evident recently at Aeronca in subcontract production of assemblies and subassemblies for Boeing B-47 and B-52 and Beech T-36 airplanes. Experience gained in this type of production will be valuable to Aeronca production of the new business plane.

▶ **Fly in 1954**—John Lawler, Aeronca president, told AVIATION WEEK the prototype plane probably would be ready for flight some time in 1954 and that it is being built on a flexible schedule, depending on the urgency of other business.

Lawler said the primary business of his company still is military production, but that Aeronca also is interested in continuing in the civil field. The prototype is committed definitely to fabrication and flight test, he said, but whether the airplane then goes into mass tooling and production will depend on the interest that business firms indicate and how it crystallizes into cash laid on the line for airplanes.

▶ **Wright Engines**—The airplane will be powered with two Wright R1820 air-cooled radial engines, rated at up to 1,525 hp. with water injection.

Estimated performance calls for landing within 2,200 ft. over a 50-ft. obstacle, and a single-engine ceiling of 20,000 ft. The airplane is designed to cruise at 306 mph.

The aircraft will have a 63-ft., 4-in. wingspan and will be 46 ft., 4 in. in length. The pressurized cabin will be custom designed and normally will house eight persons in luxury airline-type accommodations.

▶ **Forty a Day**—Shortly after World War II, Aeronca was the largest manufacturer of lightplanes in quantity production, producing two-place planes at the rate of around 40 a working day in mid-1946.

With saturation of the two-place trainer market, Aeronca went into the four-place field with a high-wing, four-place sedan and built L-16 liaison planes for the Army and National Guard. Continued slump of the small aircraft market caused abandonment of plans for the two-place, all-metal, two-control Chum and for a larger all-metal four-placer. Finally, Aeronca closed down its liaison and sedan lines and went entirely into military subcontracting production shortly after the Korean war started in mid-1950.

Reservists Outline MATS Operations

The team of reserve officers, headed by Brig. Gen. H. C. Kristofferson of Pan American World Airways, has recommended these operations procedures for Military Air Transport Service:

- Realignment of route assignments and aircraft scheduling within each of the three MATS divisions.
- Closer location of transport control, weather and flight-following centers.
- Editing flight operations manuals to avoid possible misinterpretations by air crews.
- More cross-training of pilots as navigators.
- Standardizing organization of operations, traffic and maintenance elements throughout MATS headquarters and division commands.
- Continued efforts to insure availability of frequently used spare parts.

MATS commander Lt. Gen. Joseph Smith appointed the eight-man committee of commercial air operations experts three months ago to make this study of MATS (AVIATION WEEK Jan. 5, p. 95). Gen. Smith says some of their recommendations parallel action already underway to improve MATS operations.

Strikes Threaten Engine Production

Strike threats were aimed at critical aircraft engine production this week by the CIO United Automobile Workers. Targets are General Electric's jet engine plant at Evendale, Ohio, and the Ford engine plant at Chicago.

GE may be struck Mar. 15, when its contract with UAW-CIO Local 647 expires. UAW-CIO Local 471 has not set a deadline at Ford.

GE builds the J47 Turbojet, powerplant for the B-47 bomber and the F-86 fighter series, both key items in USAF production program. Ford builds R4360 piston engines for the B-36 bomber and USAF heavy transports and is tooling for J57 jet production, a key engine in USAF plans.

Wages seem to be the main issue behind the threatened stoppages. At Evendale, Local 647 is insisting that GE match the wages paid by the highest-paying aircraft engine makers, which include Ford. It has not specified an exact figure, however. GE wants to adhere to its policy of keeping its wages in line with those paid in the general community of its plant location, in this instance Cincinnati. It has offered an increase of roughly six to eight cents an hour, which company sources say will keep its wages at about the average for engine plants.

Local 647 is also demanding a union shop, which GE opposes. A strike would not be popular on this issue alone.

The local on Feb. 22 voted 1,014 to 89 to authorize its negotiators to call a strike against GE. The Federal Mediation and Conciliation Service has intervened in an effort to prevent a strike. The International Association of Machinists, AFL, representing craft workers, also is involved in the dispute.

House Gets New Bill Asking NACA Funds

Legislation authorizing $14.6 million in new facilities for National Advisory Committee for Aeronautics has been introduced by chairman Dewey Short of House Armed Service Committee for:

- **Lewis Flight Propulsion Laboratory,** $8,514,200 for a rocket engine research facility.
- **Langley Aeronautical Laboratory,** $4,606,100 for transonic tunnel boundary-layer system, variable Mach number facility and supersonic tunnel nozzle.
- **Ames Aeronautical Laboratory,** $1,169,700 for modernization of two supersonic tunnels.
- **Wallops Island** pilotless aircraft station, $310,000, for preflight jet heat accumulator.

The authorization does not carry funds to implement the projects.

Atlantic Cargo Route Fight Begins

CAB expected to certify at least one overseas all-cargo carrier in re-opened hearings involving six airlines.

Civil Aeronautics Board hearings of six applicants for a nonsubsidized trans-Atlantic cargo certificate got underway in Washington last week, with CAB planning to wind up the case by mid-summer.

This is the re-opened trans-Atlantic cargo case that began in 1949 with applications of Seaboard & Western Airlines and Transocean Air Lines, nonscheduled international cargo carriers.

Meanwhile, the British Ministry of Civil Aviation announced that it has approved a similar application of Airwork, Ltd., to fly scheduled trans-Atlantic all-cargo service to the U. S. and Canada.

In 1951, a CAB membership including only two of the present members denied any need for specialized trans-Atlantic cargo service, and President Truman, after tabling the decision for more than a year, agreed with the Board. But a CAB majority last year voted to re-open the case, because foreign flag lines had achieved domination of the air cargo business during the interim. The Board also felt some obligation to re-examine the case, because CAB found it had failed to note a letter from the Defense Department strongly urging certification.

There are now six applicants in the case, compared with two when it opened in 1949.

▶ **Applicants**—Seaboard & Western started the case with an application in 1947. Transocean obtained consolidation after Seaboard's first prehearing conference in the spring of 1949. European-American Airways, a proposed air charter carrier, applied separately later in 1949 and eventually won consolidation in the trans-Atlantic route renewal case of Trans World Airlines and Pan American World Airways.

All three original applications were denied eventually on grounds that no more service was needed. When CAB re-opened the case, the Board allowed new applicants after some internal dissension. Flying Tiger Line, certificated transcontinental cargo carrier and Pacific airlift contractor; Overseas National Airways, Pacific airlift contractor and nonsked charter operator and nonsked Trans-Caribbean Airlines were consolidated.

▶ **Early Certification Possible**—Washington observers consider certification of one or more of the applicants a strong possibility within the year. CAB already has certificated transcontinental and Latin American cargo lines. Observers see the possibility of an even split among the four present CAB members on this case. The fifth member, who will be appointed soon, may make the vital majority decision. The CAB staff (Bureau of Air Operations) is expected to favor certification.

CAB chief examiner Francis Brown told the Board at the time of re-opening of this case that final oral argument could be scheduled as early as this June or July, making final Board decision possible this summer.

▶ **New York Urges Approval**—The Port of New York Authority urges certification of an applicant in this case. The port says its interest in the case stems from its "statutory obligation to promote, protect and plan for the trade and commerce of the New Jersey-New York Port District."

The Port Authority's statement and exhibits submitted to CAB last year noted U. S. flag carriers' share of trans-Atlantic cargo volume fell from 73% in 1947 to 39% in 1951, and their share of specialized all-cargo flights dropped from 81% in 1949 to 6% in 1951, recovering to 30% last year.

The Port Authority statement says both U. S. and foreign all-cargo flight frequency and estimations have varied from month to month, indicating need of certification on a "demand" or "area-type" basis. To show potential importance of adequate air cargo service, the authority cites prewar statistics showing $2 billion worth of annual U. S. trade with the area involved in this case, 44% of it through the Port of New York.

▶ **Specialized Service**—Proponents of CAB certification of a specialized all-cargo service make these four main arguments:

• **Combination carriers** concentrate on passenger promotion to get the most return on their investment, the cargo advocates argue. Therefore, they say, cargo promotion will suffer until it pays more unless CAB certificates specialists, who must promote air cargo on an all-or-nothing basis.

• **Foreign flag gains** in cargo service over U. S. combination carriers prove this, the cargo carriers say. Trade-dependent nations like Belgium and The Netherlands are fostering air cargo development, and now Britain has certificated an all-cargo trans-Atlantic service, they conclude.

• **Defense Department** favors fullest development of long-range specialized cargo planes and service to improve the breed and to provide reserve airlift capacity.

• **Nonsubsidized certificates** the cargo carriers are applying for would cost taxpayers nothing, they argue. Despite subsidy, they say flag carriers TWA and Pan American have emphasized passenger service.

McCULLOCH MC-4 CERTIFICATED

The McCulloch MC-4 two-place helicopter shown in flight officially has been granted certificate No. 6H3 by Civil Aeronautics Administration, the first given a tandem-rotor craft. The all-metal MC-4 is powered by a 200-hp. engine and has a top speed of 90 mph. Its maximum sea level rate of climb is 800 fpm.; range at 75 mph. is 200 mi. Gross weight is 2,300 lb., weight empty 1,600 lb. Overall length is 32 ft. 5 in., height 9 ft. 3 in., and the rotor diameter is 23 ft.

► **Counter Arguments**—Fighting the applications of the cargo carriers, TWA and Pan American point out that they have obeyed the laws of supply and demand—promoting cargo service wherever "public necessity" was evidenced by willingness to pay the cost.

They also say the Berlin and Pacific airlifts diverted their all-cargo capacity in the years cited by the opposition as indicating declining commercial U. S. air cargo service relative to that of the foreign flag lines.

The U. S. flag carriers are now adding all-cargo services, and Pan American has three Douglas DC-6A airfreighters on order. Cut-throat competition would increase subsidy requirements and delay long-range progress in this new field, they conclude.

Fire Hazards Found At AF Fuel Bases

Fire hazards, dirt and inefficiencies in Air Force storage and handling of aircraft fuels have reached such proportions that Gen. Hoyt S. Vandenberg, AF Chief of Staff, has ordered immediate steps to remedy the situation.

AF headquarters, whose inspectors have found both personal inadequacies and mechanical irregularities at "many" bases and installations, has called on commanders to have their own inspectors study and report on deficiencies so that corrective action may be taken.

Most frequent irregularties listed include: missing, dirty or damaged system filters or line screens; leaky connections, seals and valves; inoperative or not properly ballasted segregators, and inoperative or not calibrated measuring meters. Tank cars, the inspectors reported, are not being checked for water level before their contents are transferred to trailers or storage tanks.

Oil-soaked rags littered pits and trailer pumping compartments, or the compartments had arcing ignition or electrical systems.

► **Fire Hazards**—Inadequate fire preventive measures were cited: absence of charged and operable extinguishers in standby during transfer operations; lack of earth dikes or open ditches to protect storage areas; "no smoking" signs not posted and enforced around storage and transfer areas; explosion-proof lights not used for vapor-laden compartments and work areas; static ground systems incomplete or not being used.

► **Personnel Problem**—In addition to poorly maintained facilities, the headquarters inspectors reported undermanned working crews and "indifferent or unqualified" workers. Workers and their supervisors, it was said, showed unfamiliarity with important points in technical instructions. Technical publications files were "incomplete or not readily accessible to workers and work supervisors."

Inspection and maintenance records failed to reflect the true condition of equipment by omitting known defects. "Inspections are signed off but not actually made; inspections are due or overdue but not so recorded, and modifications are required but not so recorded," headquarters said.

Failure to identify fill plugs and lines by color code was included in the list.

Comet 1A vs. Stratocruiser

Sydney-Honolulu Schedules of
Canadian Pacific and Pan American

	Flight time	Distance
Total trip:		
Comet 1A	12 hr. 45 min	5,160 mi.
Stratocruiser	21 hr.	
Stages:		
Sydney-Fiji		
Comet 1A	4 hr. 30 min	1,970 mi.
Stratocruiser	7 hr. 45 min.	
Fiji-Canton		
Comet 1A	3 hr. 15 min	1,269 mi.
Stratocruiser	5 hr. 15 min.	
Canton-Honolulu		
Comet 1A	5 hr.	1,921 mi.
Stratocruiser	8 hr.	

Source: Canadian Pacific Airlines planned schedule time and Pan American World Airways published schedule time.

Crash Delays CPA Comet Plans

The fatal crash of Canadian Pacific Airlines' first DH Comet 1A on Mar. 3 during takeoff from Karachi, India, airport will cause several months' delay in the start of trans-Pacific jet transport air service by the carrier, CPA president Grant W. McConachie has stated.

Original plans called for start of Comet 1A service from Sydney, Australia to Honolulu this month. The Hawaii-North America connection would be handled by larger, piston-engine aircraft.

CPA's first Comet was en route from the de Havilland plant to Australia when the crash occurred with loss of 11 flight crew members, aircraft, engine and equipment technicians. Early reports indicated that the plane never became airborne; instead it ran through a barbed wire fence at the edge of the field, fell into a ditch and burned. De Havilland chief test pilot John Cunningham and two DH jet engine specialists have flown to Karachi to investigate.

It was the first fatal crash of a jet airliner. A British Overseas Airways Comet 1 crashed and was destroyed during takeoff at Ciampino Airport, Rome, last Oct. 26, but no one was seriously injured (Full report AVIATION WEEK Jan. 19, p. 58).

Scheduled to be aboard for the flight were Capt. C. H. Pentland, director of overseas flight operations; Capt. North Sawle, chief pilot overseas lines; R. J. Cook, radio operator; P. D. Roy, chief navigator; J. H. Smith, chief mechanic; D. H. Edwards, de Havilland chief liaison engineer; D. Morgan-Tipp, de Havilland field service; H. Waters, senior DH service engineer; B. Rees, DH flight engineer; John Wilson, DH Engine Co. field service and N. H. Gardner of Smiths Instruments, Australia.

The Comet 1A was scheduled to be christened the Empress of Hawaii in Honolulu on Mar. 11. A second CPA Comet 1A is undergoing acceptance tests in England.

The Comet 1A differs from the Comet 1 in having its four DH Ghost centrifugal-flow turbojets fitted with water/methanol injection to permit tropical takeoffs with temperate zone loads. In effect, use of water/methanol injection during takeoff is similar to lowering ambient temperature approximately 10 deg. C. The Comet 1A also carries an additional 1,000 gal. of fuel in the wings for a total of 7,000 gal., providing longer range. Takeoff weight is 115,000 lb., 10,000 lb. more than for the Comet 1. Seating is for 44 passengers.

Canadian Pacific also is considering purchasing larger and more powerful Comet 2s and 3s for its longhaul North Atlantic and South Pacific routes.

New Prop Reversal Safeguard

American Airlines has established a three-phase program to solve one of the industry's most vexing problems.

By Alexander McSurely

Any U. S. airline engineering program that puts new safeguards in airplanes is something for other carriers to watch.

But when American Airlines—largest U. S. operator of postwar twin-engine and four-engine airliners—starts a "fix" program, other airline engineers especially like to follow its progress because of the recognized competence of American's engineering department under William L. Littlewood, vice-president-engineering, and chief engineer Dan Beard.

Today American Airlines has been engaged in a three-phase active engineering program on safeguarding inadvertent propeller reversals for more than a year. Studies previously underway were started on an emergency basis the morning after a National Airlines' DC-6 crashed at Elizabeth, N. J., Feb. 11, 1952, in an accident attributed to propeller reversal. The emergency Phase I program has long since been completed, but other safeguards still are being installed.

When the program is finished within the next few months, it is hoped that inadvertent reversals thereafter will be about as remote a possibility as snowballs at the equator.

William Lawrence, engineer in charge of the program, outlines it like this:

• Phase I—immediate fixes.

1. Immediate "fleet campaign" has completed action to separate a hot wire to the reverse solenoid in a separate conduit to the firewall.

2. Indications were received that low-pitch stop had failed in some recent airline and military planes because of vibration that caused the spring to unlatch. A heavier spring was installed immediately.

3. Before the Elizabeth crash, fleet campaign action already was underway to check throttle rigging by an electrical check in maintenance.

• Phase II—quick fixes.

1. Isolation of hot wire from reverse solenoid beyond the firewall to the cockpit was continued.

2. Improvement of unfeathering cycle was made so that reverse safety switch would give secondary protection. This would mean two faults instead of one would be necessary to reverse propellers.

3. Third switch was added, independent of throttles. Action of switch is actuated by the throttle lock device. This is triggered by the landing gear switch, which pulls the reverse solenoid and permits reversing.

4. Relay boxes were rewired with arrangements allowing no single fault to cause reversal.

5. Isolation of the hot wire was extended by additional electric connector plugs at several points.

6. Wiring of reverse solenoid was changed to make it a two-wire system, after isolating the positive lead. This meant the negative side of the system was not grounded and provided control for both sides of the current. The arrangement divides vulnerability to inadvertent reversal about four times. To get a reversal inadvertently with the new system, would require a hot short to the hot lead and a negative short circuit to the negative lead.

7. DC-6 flight tests were run to establish the probability of propeller reversal with the low pitch stops inoperative. Under low-power conditions, reversal actuation usually results in disturbing carburetion sufficiently to cut-off the engine before propeller goes into complete reversal.

The flight tests indicated that with failure of low pitch stop, it is possible for the governor to take the propeller into reverse pitch when the plane is operating at very low speed and at low throttle.

The operating instructions to cope with inadvertent reversal were revised on the basis of these flight tests.

8. Possibility of feathering the wrong engine, indicated in the National DC-6 crash, pointed out the need for reverse-pitch warning lights. Installation of lights was ordered. Lights are actuated by blade switch, which indicates when the propeller is about five degrees from full reverse.

The American engineering philosophy does not agree that the early warning light advantages advanced by some other engineers outweigh the disadvantages.

• Phase III—longer term fixes.

1. Proposal for a relief valve arrangement in the low-pitch circuit and a blocking valve that can close were suggested by American to Hamilton Standard Division of United Aircraft Corp. in line with the relief valve principle proposed by Air Line Pilots Assn.

American considered it a clever job and a good design but after further study questioned the low-pitch relief valve's merit in bringing about additional safety.

It was felt that the valve added nothing to already solved electrical problems and that no serious hydraulic problems were indicated.

Lawrence said the reverse solenoid valve of the current type had a trouble-free history. A double action is involved that opens the valve and closes a drain. The drain will act to keep pressure down even should the valve happen to malfunction.

But American engineers haven't closed their books on the relief valve arrangement and are studying its possibilities further.

Recently, the airline asked Civil Aeronautics Administration for approval of another device designed to prevent reversal happening prematurely on the ground.

This could happen from a bounce during a hard landing or when a grounded landing gear Micro switch might unlock the throttle reverse lock.

The proposal is to install a disarming switch in the throttle lock circuit. The switch would be located on the pilot pedestal, available to reach of both pilot and co-pilot. It would be closed and armed at takeoff. This would leave the throttles unlocked and ready for reversing if an aborted takeoff became necessary.

Procedure calls for the switch to be opened when the plane is airborne, disarming the circuit even if the landing gear Micro switch should become grounded.

When the plane makes another landing, the switch would not be closed until wheels were on the ground—thus assuring that the lock would not be released to permit premature reversing if the plane bounced. When the switch is closed, the Micro switch would have acted at touchdown, so that the throttle lock would be released at the same instant.

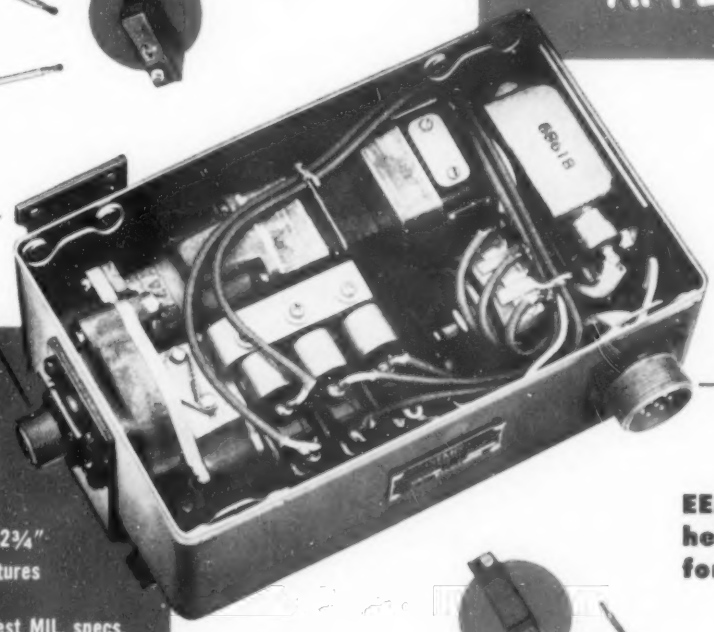
Lawrence explains that American is trying to get as much standardization as possible in the cockpits between its Douglas DC-6s and Convair 240s. Both types have the same detent-type throttles.

The disarming switch is preferred over bar or plate-type throttle lock—such as National Airlines and some other engineers are advocating—because there is a problem of designing plates to fit the throttle systems of the Convairs and the DC-6s.

There is another small advantage of disarming switch installation: elimination of chattering of the throttle lock, going on and off during touchdown due to the vertical "travel" of the landing gear.

technical bulletin by EEMCO

UNIVERSAL POWER PACKAGE HAS MANY APPLICATIONS



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U.S. Forces Take Bulk Of DH Beaver Output

De Havilland Aircraft of Canada—starting its 25th year of operations—reports production of 232 civil and military single-engine Beaver planes during the Toronto firm's last fiscal year, with the bulk taken by the U.S. Air Force and Army.

The seven-place liaison aircraft are being flown by U.S. forces in Korea and in Europe, de Havilland says.

In an annual report on the fiscal year ending Sept. 30, 1952, the company says the DHC-3 Otter became the first single-engine aircraft to be approved under International Air Carriage standards.

Profits for 1952 totaled at $259,620 compared to $165,046 during the previous year, de Havilland reports.

TWA Officers Boost Holdings in Company

Directors and a beneficial owner of Trans World Airlines, Inc., acquired a total of 263,900 shares of common stock in the firm during the last two months of 1952, the Securities & Exchange Commission reports.

Hughes Tool Co., a beneficial owner, purchased the biggest amount, 263,100 shares, giving that company total holdings of 2,476,141 TWA shares. In November, Albert V. Leslie, a director, purchased 300 shares, his total common share holdings. The following month Warren Lee Pierson, an officer and director, acquired 500 shares, giving him a total holding of 4,356 shares of common stock.

Additional transactions which have been reported to the SEC by aviation officials include:

- **Air Associates, Inc.:** Donner Trusts, beneficial owners, purchased 4,050 common shares, making a total holding of 39,950 shares.
- **All-American Airways:** Robert B. Cotton, officer, purchased 200 common shares, making a total holding of 440 shares.
- **Avco Mfg. Corp.:** James D. Shouse, officer and director, bought 700 common shares, making a total holding of 6,050 shares.
- **Bell Aircraft Co.:** Equity Corp., beneficial owner, bought and sold 65,000 common shares during December, leaving a total holding of 427,876 shares.
- **Capital Airlines, Inc.:** Arthur F. Kroeger, director, bought 100 common shares, making a total holding of 200 total shares; Raymond G. Lochiel, officer, received 800 common shares, giving a total holding of 3,915 shares; Robert J. Wilson, officer and director, sold 100 common shares, leaving a total holding of 1,400 shares; under options for common shares, Raymond G. Lochiel, officer, exchanged or converted 800 shares, leaving a total holding of 3,900 shares.
- **Continental Air Lines:** Stanley O. Halberg, officer, bought 100 common shares, making a total holding of 200 shares.
- **Douglas Aircraft Co.:** Arthur E. Raymond, officer and director, returned to issuer his last 600 shares of Class A common stock.
- **Eastern Air Lines, Inc.:** Leslie P. Arnold,

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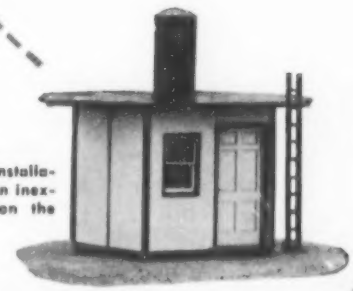

TVOR single unit installation needs only an inexpensive shelter on the field.

New terminal VHF omnidirectional radio range adds safe instrument approach facilities to any airport. CAA approved. Installs directly on the airfield. Includes field detector, antenna and installation test equipment. *And is available on 90 day delivery.*

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TVOR builds air traffic by extending service through marginal weather . . . increases airline passenger service by eliminating flights lost due to rain and fog . . . brings corporation aircraft to their home field in poor visibility.

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TVOR commercial transmitters are the same as those designed and built for the CAA.

TVOR changes fair-weather to all weather airline service.

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TVOR works with standard instrumentation. Private planes "home" on their own airfield.

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officer, bought 1,000 common shares, making a total holding of 3,600 shares; Joseph H. Brock, officer, bought 100 shares of common, making a total holding of 903 shares; Morris M. Frost, officer, bought 1,000 common shares, making a total holding of 1,300 shares; and Stuyvesant Peabody, Jr., director, sold 200 common shares, leaving a total holding of 1,000.

• **Fairchild Engine & Airplane Corp.:** Grover Loening, director, sold 10,000 common shares, leaving a total holding of 10,000 shares.

• **Flying Tiger Line, Inc.:** James E. Davidson, director, sold 500 common shares, his total holding.

• **Glenn L. Martin Co.:** G. T. Willey, officer, acquired 148 common shares, making a total of 312 shares held.

• **Minneapolis-Honeywell Regulator Co.:** P. B. Wishart, officer and director, bought 330 shares of common stock, making a total holding of 1,010 shares.

• **National Airlines, Inc.:** Jean G. Brawner, officer and director, bought 1,040 common shares, making a total holding of 1,200; Robert P. Foreman, officer and director, bought 1,481 common shares, making a total holding of 1,700; Walter P. Johnston, officer, bought 705 common shares, making a total holding of 805; John L. Morris, officer, bought 1,000 common shares, making a total holding of 1,010; Jerome M. Rosenthal, officer, bought 1,000 common shares, making a total holding of 1,500; Walter Sternberg, officer, bought 1,031 common shares, making a total holding of 1,131; and R. E. Wieland, officer, bought 1,108 common shares, making a total holding of 1,408 shares.

• **National Aviation Corp.:** Frederick F. Robinson, officer, bought 300 common shares, making a total holding of 400 shares.

• **Northwest Airlines, Inc.:** A. E. Floan, officer and director, sold 100 common shares, leaving a total holding of 100 shares; Alonzo Petteys, director, bought 500 of 4.60% preferred shares, making a total holding of 2,500 shares.

• **Pan American World Airways, Inc.:** Erwin Balluder, officer, received 205 common shares, making a total holding of 14,750 shares; H. M. Bixby, officer and director, received 103 common shares, giving a total holding of 8,103 shares; R. G. Ferguson, officer, received 144 common shares, giving a total holding of 648; Harold E. Gray, officer, received 185 common shares, making a total holding of 1,822; John C. Leslie, officer and director, received 205 common shares, giving a total holding of 531; Andre A. Priester, officer, received 103 common shares, giving a total holding of 4,623 shares; Samuel F. Pryor, officer and director, received 246 common shares, giving a total holding of 5,415; John S. Woodbridge, officer, received 155 common shares, giving a total holding of 459.

• **Piper Aircraft Corp.:** Norman J. Greene, director, bought 1,500 common shares, making a total holding of 5,000; W. T. Piper, officer and director, sold 800 common shares, leaving a total holding of 138,856 shares.

• **Republic Aviation Corp.:** Mark G. Veckman, officer, bought 100 common shares, making a total holding of 1,100 shares.

• **Roosevelt Field, Inc.:** Webb & Knapp, Inc., (Del), beneficial owner, acquired 90,890 common shares in two separate transactions of last July and December, bringing their total holding to 147,490 shares.

• **Solar Aircraft Co.:** Herbert Kunzel, officer and director, bought 200 common shares, making a total holding of 300 common shares; Edmund T. Price, officer and director, bought 400 common shares, making a total holding of 12,929.

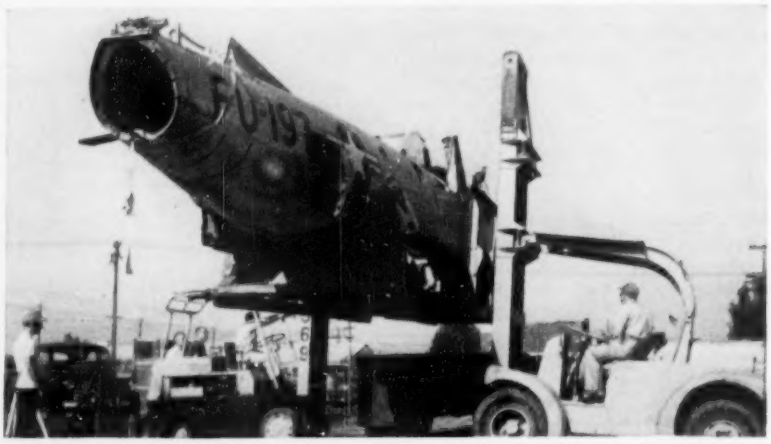
• **Sperry Corp.:** C. M. Green, officer, bought 1,000 common shares, making a total holding of 1,100; Bert T. Oakley, officer, bought 400 common shares, total common stock holding; Charles Ondrick, officer, bought 1,100 common shares, making a total holding of 1,200.

• **United Aircraft Products, Inc.:** Robert K. Hart, director, bought 300 common shares, making a total holding of 800 shares.

• **Western Air Lines, Inc.:** Hugh W. Darling, director, bought 700 common shares, making a total holding of 2,000.

How NAA Revitalizes Our

STRIPPING protective plastic film from veteran F-86A preparatory to sending plane to shops for extensive overhaul and modification.



HOISTING a stripped Sabre in its wooden cradle is done with two fork-lifts. It will be trucked to its next station where overhaul starts.

OVERHAULING a batch of Sabres on the ramp at NAA's Fresno, Calif., modification base. T-6 trainers also are reworked here.

War-Weary Combat F-86s From Korea

North American Aviation is modernizing earlier versions of its F-86 Sabre at a special modification center at Fresno, Calif. The center now employs 1,200 people and is headed by L. S. Wait, general administrator.

The Fresno center has been handling a mixed bag of Sabres, including war-weary combat planes airlifted back to California from Korea, Canadian-built models manufactured by Canadair at Montreal, and early models used in advanced fighter training.

Some 60 Canadair-built F-86Es were rushed through the Fresno center to meet an acute shortage of Sabres in the two USAF fighter-interceptor wings battling Russian MiG-15s over Korea. The Canadian planes were equipped with latest types of USAF radio, electronic and gunsight equipment and rushed to Korea aboard a Navy carrier.

► **New Engines**—Sabres returned from Korea are taken apart completely and put through a modification line where they receive the latest electronic, radar and armament systems. New General Electric J47 axial-flow turbojets of considerably higher thrust than those first used in Korea are installed.

Some control modifications also are made, but the flying tail that has been featured on all models beginning with the F-86E is not added to the earlier F-86As that go through the line. The flying tail and elimination of leading edge semi-automatic wing slats (AVIATION WEEK Jan. 19, p. 11) have increased materially the controllability of the Sabre at sonic speeds reached in Korean combat.

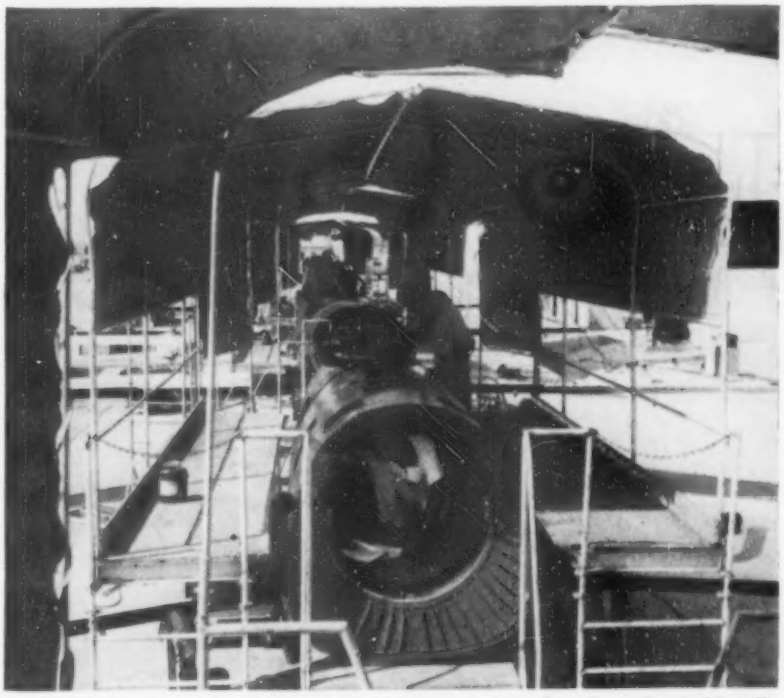
Korean veteran Sabres that already have gone through the Fresno line have a total of 6 MiG kills to their credit, 43 probables and 31 damaged.

In addition to the Sabre modifications, North American also is modernizing World War II T-6 advanced trainers into the new T-6Gs used by USAF as primary trainers.

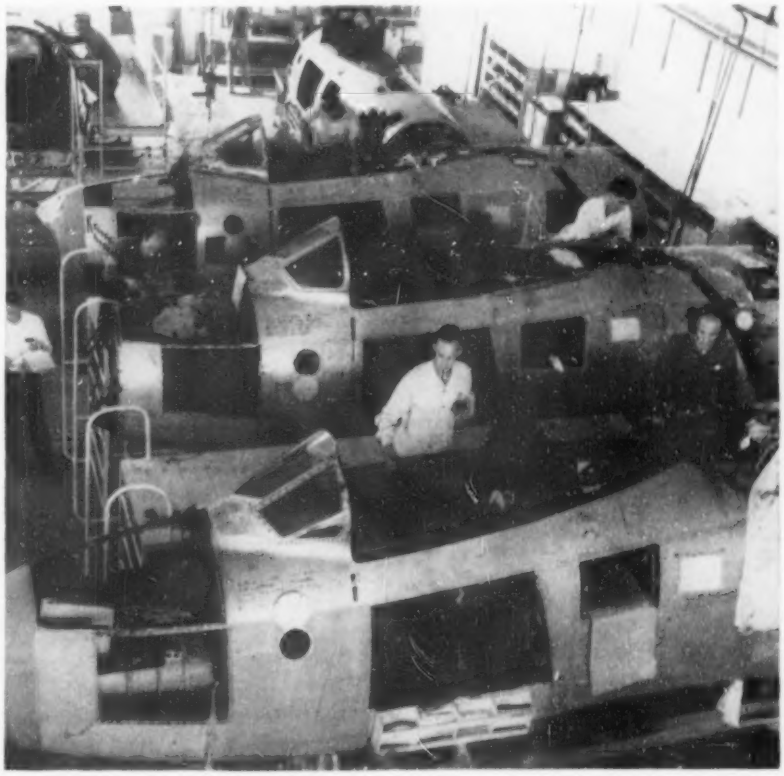
► **Other Production**—North American's main plant at Inglewood is producing the F-86D night-fighter version of the Sabre and the F-86H, latest day-fighter version.

The FJ-2—the Navy's carrier-based version of the Sabre—is being delivered from NAA's Columbus, Ohio, plant. A later version, the FJ-3 powered by a Wright J65 7,200-lb.-thrust turbojet, is scheduled for production by early next year.

At Inglewood, North American is developing the F-100, a successor to the Sabre with a 45-deg. wing sweepback and a P&WA J57 10,000-lb.-thrust turbojet with afterburner.

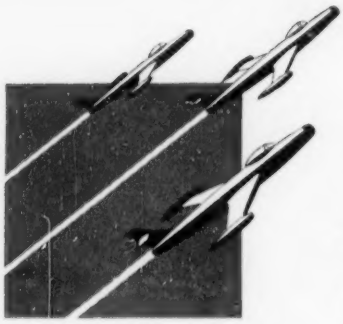


CANOPIES protect workers from sun's heat, as these planes have electrical installations, rigging and tubing brought up to date.



SABRE forward fuselage sections get armament overhaul and latest radar and other electronic equipment. Note close stacking of planes.

PHOTO COURTESY BOEING AIRPLANE COMPANY



Fighting corrosion before it starts

Corrosion and airplanes just don't go together—especially not when aircraft is flying faster than sound, where every stress and every strain is magnified to far greater significance than ever before.

About the best way to fight corrosion, to keep it from destroying metal surfaces and joints, is to whip it at the outset, before it gets a foothold.

To help aircraft manufacturers in their continuing war on metal corrosion, 3M developed EC-843—a sprayable coating that sets as a tough, flexible film which protects flat surfaces, joints, and even dissimilar metal splices against the effects of corrosion.

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First Cutaways of Doman Rotor System

- **Reveal detail makeup of four-blade copter unit.**
- **Installation to be used on Doman LZ-5 and YH-31.**

These first cutaway views show the detail makeup of key units in Doman Helicopter's four-blade rotor system.

This rotor installation is used in the Doman LZ-5 and its military version, the YH-31, both now in the process of Civil Aeronautics Administration certification. Details of the copter were given in AVIATION WEEK's analysis, Jan. 7, 1952, p. 21.

►**To Field Forces**—The U. S. Army Field Forces, through Air Force procurement, have bought a service-test quantity of the YH-31. Initial flight of the copter probably will take place some time this month. Delivery of copter to the Army Field Forces probably will be made next fall, following CAA certification.

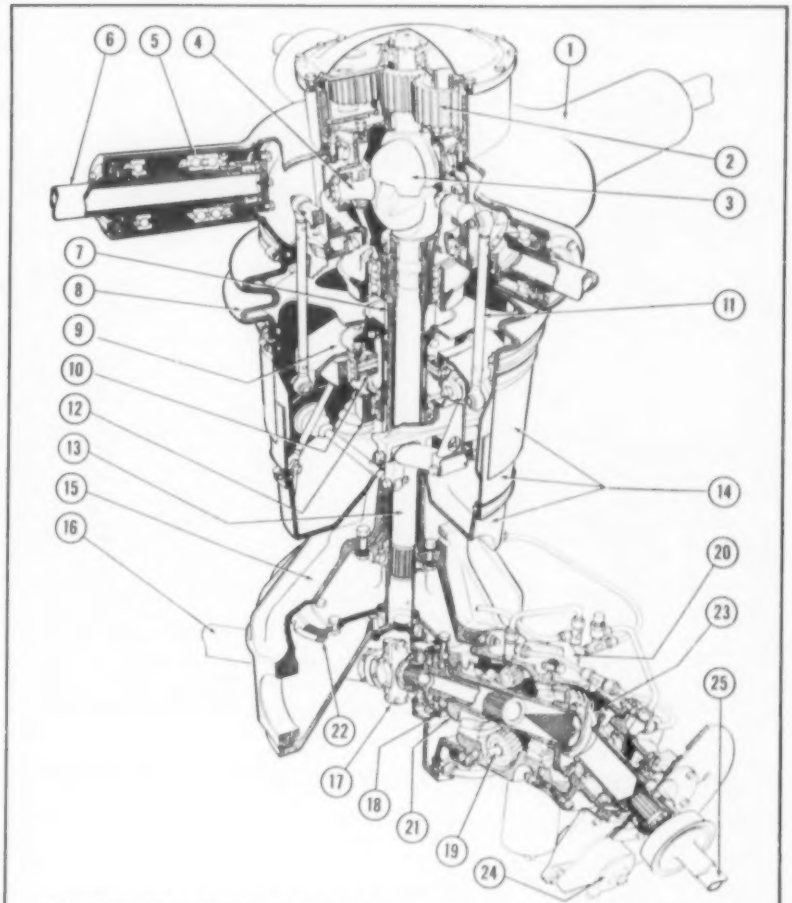
Features of the copter include 7-ft.-wide cabin door openings for bulky cargo loading; cockpit location over the engine for compactness and accessibility; fluid clutch rotor starting; all pilot controls accessible with shoulder harness in use; interchangeable rotor blades; and tail rotor above normal head height.

The cabin floor structure is a dural sheet box beam with compartments to accommodate the fuel cells, the battery, electrical regulators, auxiliary fuel pump, landing gear torque shaft and also the ducts for the engine ejection cooling system. On the forward end of the floor beam are fittings for attachment of engine mount and nose wheel struts.

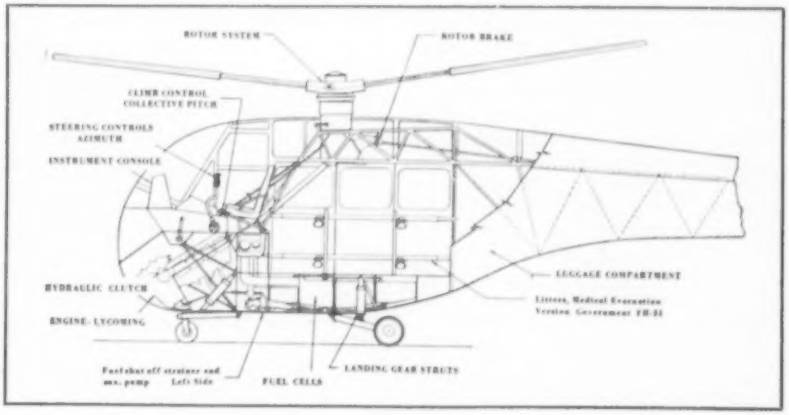
A twin-engine rotary-wing craft, also projected to use the Doman rotor system, is now under study for inter-airport and city-to-airport services (AVIATION WEEK Nov. 10, 1952, p. 18). This ship is now projected to employ two 200-hp. Boeing 502 turbines instead of a single 400-hp. piston engine.

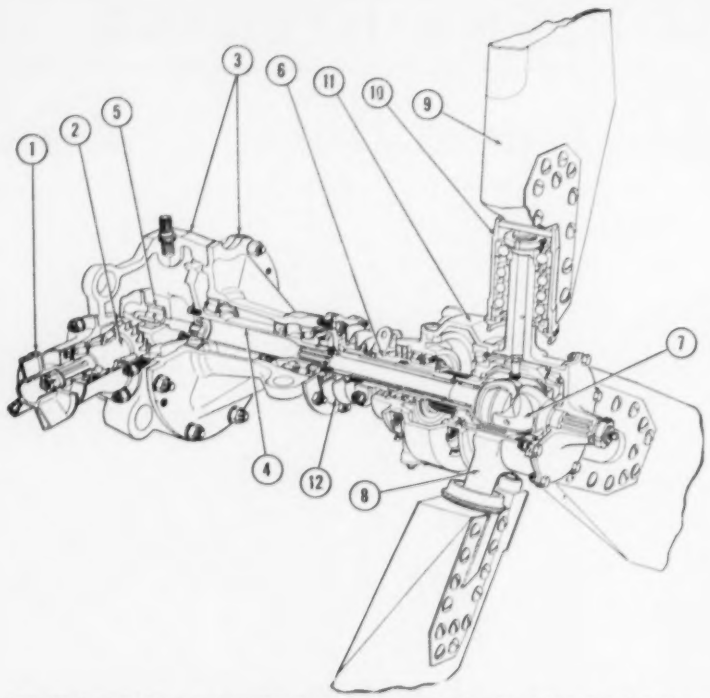
►**Rotor Details**—Doman's rotor system is a proved installation developed after a long flight research program.

The hingeless rotor measures 48 ft. in diameter, with an individual blade area of 15.4 sq. ft. Disk area is 1,810 sq. ft. and effective solidity ratio is .0407. Rotor rpm is 182.5 (cruising at



MAIN ROTOR HEAD DETAILS: 1, hub; 2, planetary reduction gears; 3, constant-velocity universal joint; 4, hub gimbal; 5, blade pitch bearings; 6, blade spar tube; 7, pylon support tube; 8, azimuth drive boot; 9, azimuth plate; 10, azimuth gimbal; 11, blade pitch rods; 12, collective pitch bearing housing; 13, driveshaft; 14, controls enclosures; 15, main transmission housing; 16, main driveshaft from engine; 17, universal joint; 18, freewheeling clutch; 19, rotor tachometer generator take off; 20, rotor oil pump; 21, spiral bevel pinion shaft; 22, spiral bevel reduction gear; 23, spiral bevel, tail rotor takeoff gears; 24, rotor brake; 25, tail rotor driveshaft.





TAIL ROTOR DETAILS: 1, input coupling, 2, pinion shaft; 3, two-piece right-angle housing; 4, gear shaft; 5, oil pump; 6, pitch control sleeve; 7, constant-velocity universal joint; 8, hub; 9, blade; 10, blade root and bearing pack; 11, rotating boot; 12, stationary boot.

3,000 engine rpm.). Takeoff power loading for the LZ-5 is 12.5 lb./hp.; for the YH-31, 11.05 lb./hp.

The tail rotor is a smaller version of the main rotor.

Speed reduction gearing is an integral part of the rotor head assembly. Circulating oil is pumped to all bearing surfaces. Cover plates provide access for inspection and removal of gearing.

Plane Plant Opened To Engineering Profs

Beech Aircraft Corp. is giving engineering instructors a first-hand look at the practical application of theory. Beech is making it easy, too, for these men to see an aircraft factory in operation.

Beechcraft Bonanzas are used to fly college professors to the Wichita factory site in a company program to foster close cooperation between industry and education in the midwest. Beech needs engineers, and it hopes to encourage their recruitment with this program.

The day-long tours allow educators to scrutinize at close range the engineering methods employed in a modern aircraft plant, giving them a good idea of what industry requires from young engineers. The plan fosters personal contact between industry and engineering schools and permits educators to become better acquainted with problems in aircraft production.

Recent visitors to the factory included educators from the University of Kansas, Kansas State College, Parks Air College and University of Wichita.

Scheduled to be flown in for the plant tour are groups from universities in Oklahoma, Nebraska, Colorado and Missouri.

Titanium Sponge Output to Be Raised

Titanium sponge production will be boosted through new facilities being built at E. I. du Pont de Nemours and Co.'s Newport and Edge Moor, Del., sites.

Target is to produce an estimated additional 13,500 tons of the material during the next five years. Titanium sponge is the starting material for titanium alloys used in the construction of aircraft.

This expansion, undertaken at government request, will include at Newport a main manufacturing building, powerhouse, office building, laboratory, finishing building and change house. Work completion is scheduled for the middle of next year. Work at Edge Moor will consist mainly of additions to existing facilities.

25-Ton Drophammer Built for AF Use

The first of eight 50,000-lb. steam drophammers being built by Erie Foundry Co. for the Air Force recently was shipped to a midwestern forging producer for steel turbojet components.

Reportedly the largest of its type installed in this country, shipping weight of the unit exceeded 800 tons. Installed, it stands 30 ft. above ground, extends 16 ft. below.

Company also is building a series of smaller hammers for forging turbine blades.

PRODUCTION BRIEFING

▶ **Delavan Manufacturing Co.,** Des Moines, is moving its headquarters into the company's new plant at Grand Ave. and Fourth St., West Des Moines. The firm manufactures fuel nozzles for jet aircraft engines.

▶ **Lebanon Steel Foundry** recently opened a new Centri-Die shop at Lebanon, Pa. The shop, capable of producing 200 tons a month of high-alloy centrifugal steel castings, will cast jet engine rings primarily for Wright Aeronautical Division of Curtiss-Wright Corp.

▶ **Fenn Manufacturing Co.,** Hartford, Conn., is building a $1,250,000 aircraft parts plant at Newington, Conn. President Wilson L. Fenn says the company's production of plane parts will be doubled in the 72,000-sq. ft. plant.

▶ **Consolidated Industries, Inc.,** West Cheshire, Conn., has purchased the Tobrin Tool Co., Plantsville, Conn., for production of titanium and aluminum forged aircraft parts. The Tobrin plant will be operated as a subsidiary of Consolidated.

▶ **Hydro-Aire, Inc.,** aircraft accessories manufacturer, has completed a $4-million expansion of facilities at Burbank, Calif. The new construction adds 122,000 sq. ft. of floor space to Hydro-Aire's four Burbank plants.

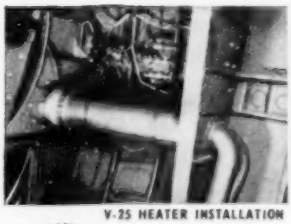
▶ **Industrial Sound Control, Inc.,** Hartford, Conn., has bought a new 180,000-sq. ft. plant at Rockville, Conn., to increase output of jet engine mufflers and panels.

▶ **Weber Aircraft Corp.,** Burbank, Calif., has received a major subcontract for production of Temco Corp. ejection seats to be installed in Navy F3H jet fighters.

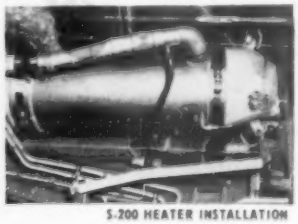
heat for the HUP and the "Work Horse," too

Piasecki helicopters are in the news performing rescue operations as well as a variety of other tasks. Note-worthy feature of the HUP-2 is a hydraulic hoist which can pick up as much as 400 pounds of cargo, or bring a litter into the cabin. Rescue work particularly, requires dependable cockpit and cabin heat. This and other heating requirements are met in full with Janitrol heaters: V-25s aboard the HUP models, S-25s for the H-25, and S-200s on the H-21 "Work Horse."

Your Janitrol representative is always at your service.



V-25 HEATER INSTALLATION



S-200 HEATER INSTALLATION

Janitrol

AIRCRAFT-AUTOMOTIVE DIVISION, SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

F. H. Scott, 225 Broadway, New York, N. Y. • C. B. Anderson, 2509 W. Berry St., Ft. Worth, Tex. • L. A. Curtin, 7046 Hollywood Blvd., Hollywood, Calif. • F. H. Scott, 4650 East-West Highway, Washington, D. C. • Phil A. Miller; Frank Deak, USAF Coordinator, Central District Office, 400 Dublin Ave., Columbus, Ohio • Headquarters, Toledo Ohio

RYAN Q-2 FIREBEE is launched from B-26 bomb-bay and is tracked by two jets.

SUSPENDED beneath its special Smith chute, after a flight, Q-2 nears the ground.

Drone Saver

- **Q-2's parachute system recovers target jets.**
- **Equipment undamaged in numerous test drops.**

Intact recovery of heavy, highspeed jet target planes has been made possible through the joint efforts of Ryan Aeronautical Corp., the USAF and the Prevost F. Smith Parachute Co.

Extensive trials of the recovery scheme—a two-stage parachute system—were conducted at Holloman Air Development Center during development of the Ryan Q-2 Firebee jet drone.

First a simulated target duplicating the Q-2 in general structure and weight was used. Now, the Q-2 itself is being carried aloft in the bomb bay of a Douglas B-26, dropped and put through its evasive maneuvers. When its fuel runs out, the target drone is taken over by the chute system and recovered intact for reuse.

▶ **Severe Conditions**—In the first tests, Ryan technicians simulated conditions more severe than encountered in actual service. The chute system had to recover a maximum-weight unit traveling at maximum speed. But the real drone—the Q-2—begins to use fuel and loses weight the instant it is launched.

In the most extreme experiments, the test vehicle was ballasted to a simulated Q-2 flight with full fuel tanks.

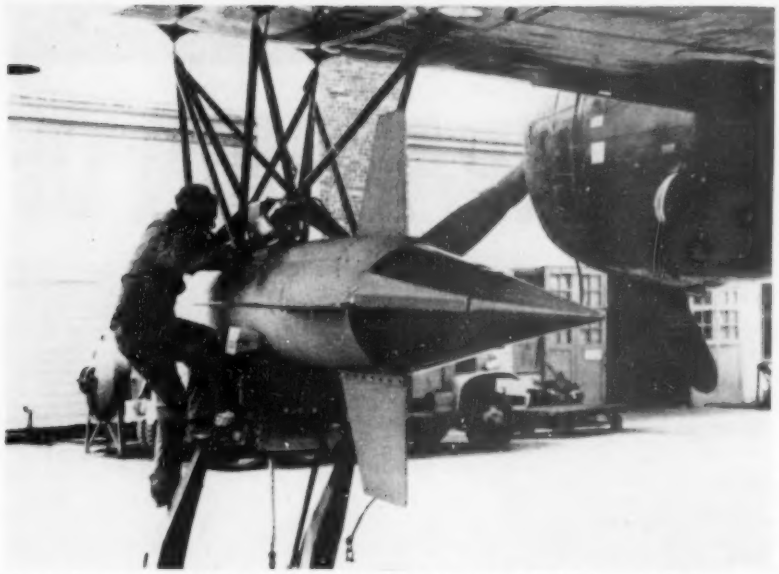
▶ **Construction Details**—The two-stage chute's main canopy is about half the weight of a conventional-design parachute of comparable size. It billows after release of a small drag chute.

The chute panels, from skirt to vent, are formed in the exact shape they take when opened. This requires the use of less fabric and cuts weight. The cloth is a lightweight, high-strength material.

Chute mouth is narrower than the outside diameter, to lower the opening shock load. Both chutes are located aft of the drone's tail surfaces to minimize possibilities of fouling.

A sequence timer assembly releases the chute. This timer can be actuated by the "beeper pilot" who operates the remote control box on the ground, governing the target's flight. There is also a separate relay that can be operated from the remote control to release the chutes.

▶ **Operational Steps**—For letdown, the small conical drag chute container is released automatically. Next, the drag chute flares out, bringing the first sharp deceleration to the Q-2. After an interval, the main chute container is released and pulled rearward by the drag chute, deploying the main chute from



CHUTE TEST VEHICLE is hooked up under B-29 wing. The chutes are in tailcone.

a bag. The arrangement is such that the suspension lines are drawn out before the parachute's canopy can deploy and inflate.

The tremendous pull of the drag chute breaks a cord extending from the main chute container to the lines at the vent of the main chute. After the cord breaks, the drag chute lowers the container and deployment bag, while the main chute itself lowers the drone, keeping it level during the descent.

▶ **Quick Disconnect**—On impact with the ground, a swivel link between the chute suspension lines and the nylon webbing riser attached to the drone is automatically disconnected. This separates the chute from the plane and prevents damage which normally would occur if wind picked up the chute and dragged the Firebee drone.

Numerous successful recoveries of the Q-2s have been made, with virtually no damage to delicate internal equipment.

The chutes are required to be of such durability as to permit repeated use under the most critical conditions, Ryan reports. The parachute recovery system has been accepted by the Air Force as suitable for the Q-2 pilotless plane and has been standardized.

▶ **Program Personnel**—Technical details of the test program were supervised by Ryan's director of engineering, Bruce Smith, and the Q-2 project engineer, Forrest Warren. W. S. Cockrell directed the actual tests.

Wright Air Development Center personnel assisted Ryan engineers by providing design data, construction features and corrective ideas. The Air Force also supplied launching planes and crews, facilities of the special parachute section for chute repacking and ground services for recovery of test vehicles after drops.

French Engineers Plan 1953 Meeting

A feature of the twentieth international aviation show in Paris next summer will be the congress of the French Association of Aeronautical Engineers and Techniques (AFITA).

The AFITA council has chosen production of airframes as the subject for discussion at its technical meetings, and is soliciting papers from engineers throughout the world.

Entry forms—obtainable from the society—must be returned by May 1, 1953, and papers submitted by June 10, 1953. If the author cannot make the trip to present the paper in person, a qualified member of the AFITA will present it, or the author may designate someone himself.

Papers must be written in French; AFITA will arrange for translation if the original is in English, German, Italian or Spanish. For this service, papers must be received before May 1, 1953.

General subjects of the meeting are: Prototype design and mass production, prototype production, mass-production planning, manufacturing for mass-production, tolerance limits and quality control, and new trends in aircraft production.

Correspondence should be addressed to the secretary, Association Francaise des Ingenieurs et Techniciens de l'Aeronautique, 6, Rue Cimarose, Paris XVI.

IAS Summaries

Paper on helicopter, boundary layer stabilization and sailplane developments presented at the 21st annual meeting of the Institute of Aeronautical Sciences are summarized on this page and page 32.

These summaries conclude a series AVIATION WEEK began five weeks ago on the Institute's presentations.

Rotating Wing Aircraft

(Joint Session in Cooperation with the American Helicopter Society)

▶ **Effects of Articulated Rotor Dynamics on Helicopter Automatic Control System Requirements.** Charles W. Ellis, III, Test and Dev. Engr., Kaman Aircraft Corp.

A theoretical investigation was carried out to determine the influence of an articulated rotor on the dynamic properties of a stabilized helicopter. This investigation indicated that any analysis of a high-gain attitude stabilization scheme should include the dynamics of the rotor; it also indicated that simplified methods of considering the effects of such rotor dynamics were feasible.

In conjunction with this investigation, an experimental program was carried out. Comparison of predicted and measured helicopter dynamics indicated the validity of the simplified methods considered and bore out the conclusion that rotor dynamics should be included in high-gain attitude stabilization analyses.

▶ **Forward-Flight Lateral Stability and Flying Qualities Studies of the Tandem Helicopter.** K. B. Amer, Flight Research Div., Langley Aero. Lab., NACA.

Results of flight-test measurements and corresponding pilots' opinions of the forward-flight lateral-directional flying qualities of a tandem helicopter in several different configurations are compared and analyzed. The conclusions are presented in the form of desirable flying qualities goals applicable to all types of helicopters. Comparison between theoretical analyses and experimental results indicates theory to be a useful tool for studying means to achieve these goals.

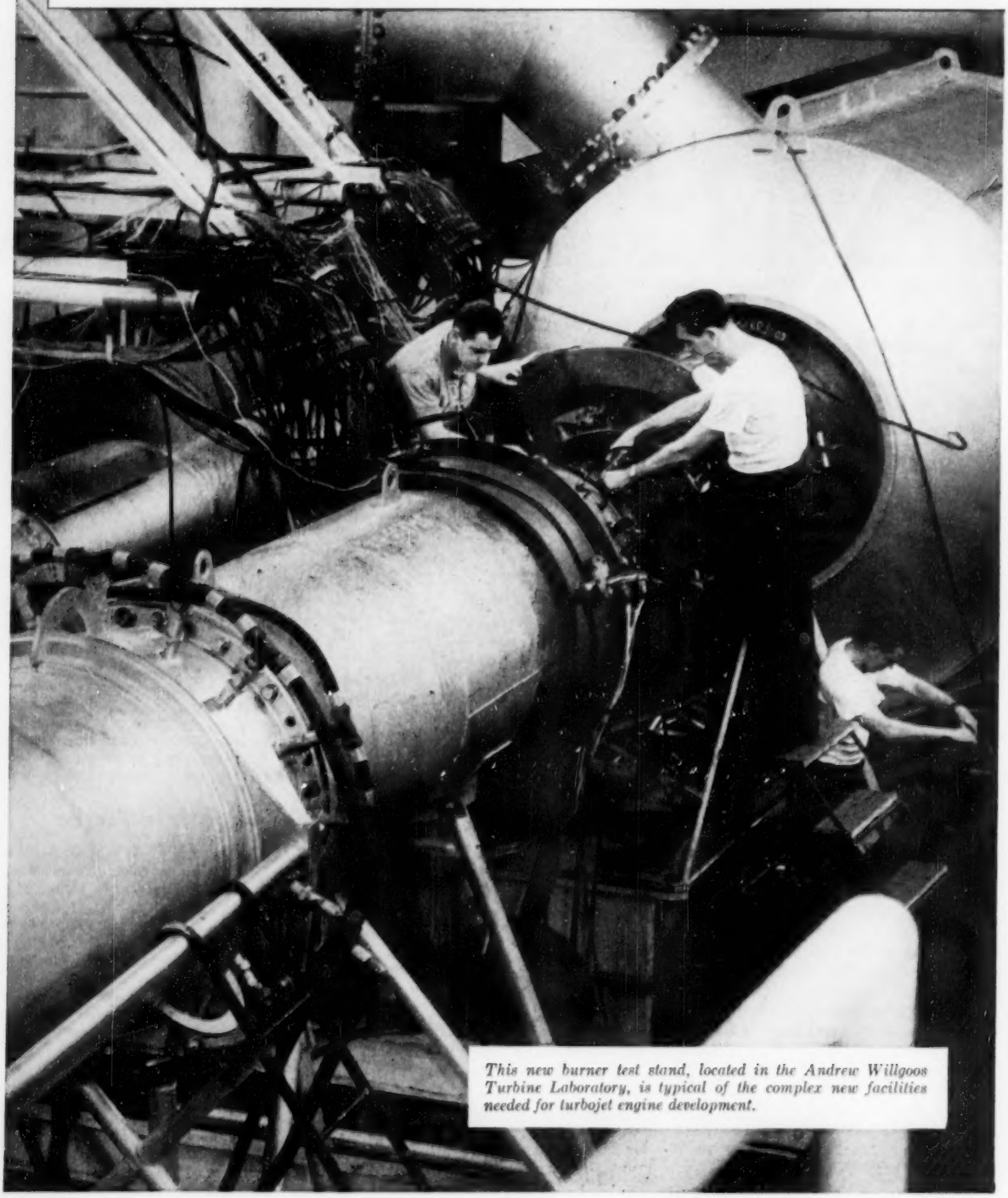
Motorless Flight

▶ **Investigation of a Windmill Suction Source for Boundary-Layer Stabilization.** Glenn D. Bryant, Aerophysics Dept., Mississippi State College.

Studies of boundary-layer stabilization have pointed to the need for a reliable suction source having reasonably high efficiency and desirable variation of flow and suction pressure characteristics with speed. Venturi sources have shown excessively low efficiencies, and tip sources have shown undesirable suction pressure variation with speed.

Theoretical and experimental studies were undertaken which showed that these conditions could be met reasonably well by a windmill-driven pump. The first type investigated was a windmill in which the suction air passed radially through the hollow blades and exhausted at the tips in the

FOUR-FOLD EXPANSION OF



This new burner test stand, located in the Andrew Willgoos Turbine Laboratory, is typical of the complex new facilities needed for turbojet engine development.

EXPERIMENTAL FACILITIES

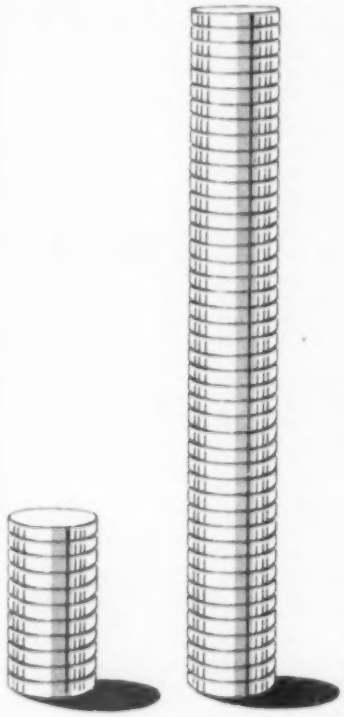
For New Aircraft Engine Development

TODAY, more than ever, high achievement in aircraft engine development demands tremendous experimental facilities. This is especially true at Pratt & Whitney Aircraft where engines of greater and greater power are being developed for the military and commercial needs of today —and tomorrow.

At the close of World War II, Pratt & Whitney Aircraft was the world's foremost piston engine builder. Naturally its experimental facilities were extensive. But today's broad program in the turbojet, turboprop and ramjet power plant fields has required an enormous increase in such facilities . . . at a dollar investment four times as great now as in 1945.

Our multi-million-dollar Andrew Willgoos Turbine Laboratory, the most complete privately-owned turbine engine test laboratory in the world, is a major example of these post-war facilities. Here experimental jet engines or individual parts of engines are tested and developed under an infinite variety of temperatures and simulated altitudes. In the Willgoos Laboratory, and in more than a score of other new laboratories and test facilities, power plant designs of the future are explored and proved.

Constant expansion of experimental facilities is only one aspect of aircraft engine manufacture, but it illustrates an entire industry problem. It helps demonstrate, too, why —today as always—dependable engines take time to build.



The above chart illustrates the huge increase in Pratt & Whitney Aircraft's investment for experimental and test facilities from January 1945 to January 1953. In 1945, we built only piston engines. Today, our program also includes turbojet, turboprop, and ramjet engines. This four-fold expansion covers only experimental and test facilities—it does not include additional heavy investments in new production facilities.

Pratt & Whitney Aircraft

MAIN OFFICE AND PLANT: EAST HARTFORD, CONNECTICUT
BRANCH PLANTS: NORTH HAVEN, SOUTHINGTON, MERIDEN

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

manner of a centrifugal pump. This type showed efficiencies in excess of 30 per cent.

Theoretical studies were also made of a windmill with an axial-flow, multiple-stage fan in the hub. This type indicates the advantage of eliminating the losses from the tangential velocity of the exhaust and the inefficiency of the thick airfoil required in the radial-flow type.

▶ **Flight Measurements of Automatic Trailing-Edge Suction on a Sailplane.** August Raspet, Aerophysics Dept., Mississippi State College.

This paper concerns an investigation made on a sailplane equipped with a trailing-edge suction slot that covers two-thirds of the wing span. Special wing tips were installed and explored for pressure distribution. An experimental iteration method was used to arrive at a location and shape for the opening on the tips' upper surface which would yield a high suction pressure. The flow coefficient obtained was of an order that should have resulted in aerodynamic improvements.

The results obtained in these tests, however, hold no promise for application to airplanes in general. No improvement in the lift/drag ratio was found, nor was there any essential improvement in overall drag. The maximum lift coefficient was not increased beyond that obtainable on a plain wing. Rolling response measurements of a fully asymmetrical distribution of suction through the trailing-edge slot yielded a roll rate about 10 per cent of that developed by the ailerons.

Fast Writeoffs

Accelerated tax amortization for manufacturers expanding their defense facilities is granted by the government in the form of certificates of necessity.

In the following list of recent certificates, company name is give, followed by product or service, cost of construction deemed necessary for defense expansion, and the percentage of the expansion cost allowed for fast writeoff. Fast writeoff permits property to be depreciated in five years.

- **Arma Corp.**, Brooklyn, N. Y., aircraft and ordnance parts, $19,226, 65%.
- **Bell Aircraft Corp.**, Fort Worth, aircraft and parts, $175,000, 60%; $53,272, 65%; $66,000, 60%; $17,000, 60%.
- **Bell Aircraft Corp.**, Wheatfield, N. Y., aircraft and parts, $41,135, 65%; $110,000, 60%.
- **Curtiss-Wright Corp.**, Wood-Ridge, N. J., aircraft engines, $784,381, 60%.
- **Alfab Manufacturing Co.**, Miami, Fla., aircraft parts and machine tools, $31,315, 70%.
- **Aeroquip Corp.**, Jackson, Mich., aircraft parts, $81,699, 70%.
- **Flour City Ornamental Iron Co.**, Hennepin County, Minn., aircraft parts, $101,328, 65%.
- **Talley Aircraft Parts, Inc.**, Phoenix, machining of military end items, $5,162, 70%.
- **Hydro-Aire, Inc.**, Los Angeles County, Calif., aircraft accessories, $113,787, 70%.
- **Niles-Bement-Pond Co.**, Warwick, R. I., aircraft engine accessories, $58,178, 65%.
- **Island Machine Co., Inc.**, Farmingdale, N. Y., machining of aircraft parts, $69,157, 50%.
- **B. H. Aircraft Co., Inc.**, Farmingdale, N. Y., aircraft parts, $4,266, 70%.
- **Indiana Realty Corp.**, Ozone Park, L. I., N. Y., aircraft parts, $45,000, 45%.

MT. WASHINGTON laboratory, where jet powerplants are put through . . .

ICING TRIALS in hangar (above). Water-spray rig is attached to inlet duct.

Jet Engines Tested on Icy Peak

Jet engine manufacturers are putting powerplants through intensive preflight icing trials in a natural laboratory on the frozen, windswept, 6,240-ft. summit of New Hampshire's Mt. Washington.

The peak's test station is operated jointly by the Air Force's Research and Development Command and the Navy's Bureau of Aeronautics.

A small test hangar on the mountain top is chained to the rock. For four months of the year, wind speed ranges from 75 to 110 mph., and it has been known to reach 230-mph. Temperatures have dipped as low as −46 deg.

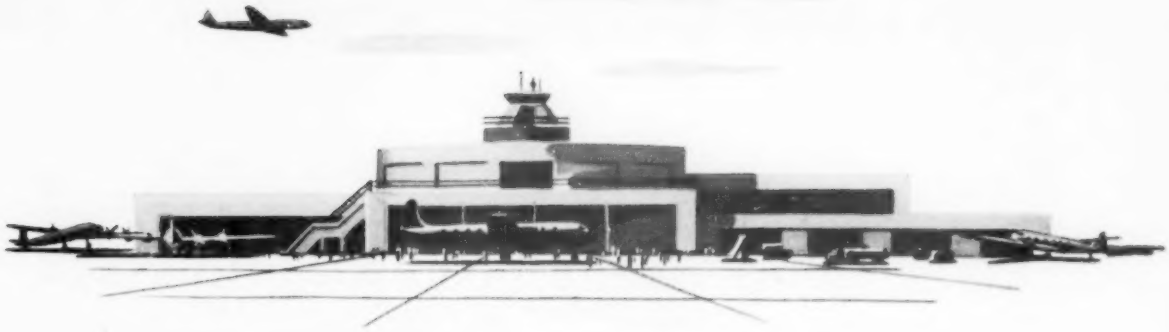
Jet test engineers welcome the low temperatures and high moisture as ideal for their work. Most icing affects jet engines when a plane is dropping from 6,000 ft. to sea level at reduced throttle for a landing approach, engineers say. Running a jet on Mt. Washington simulates this condition closely.

Recently, two General Electric Aircraft Gas Turbine Division engineers—Walton Solien and Elmer Packheiser—completed a three-week research assignment at the isolated station, running tests on GE jets and checking natural icing conditions, liquid water content and size of droplets. Additional tests are scheduled.

Most development work on the anti-icing features of GE's first "hot nose" jet, the J47-23, was done in the mountain's test hangar.

In climatic tests on prototypes of production jets, engineers determine at what speeds the engine will begin to ice and work out maximum operating conditions. The tests also give an indication whether the engines will comply with AF icing specifications.

Other important test work is the refinement of anti-icing techniques. Development and testing of instruments for detecting icing conditions in engines also has been done at this location.



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for the best safety record in history!

The nation's airlines set new all-time records in passenger traffic and in safety of air travel for 1952. This is a magnificent tribute to airline maintenance methods and personnel.

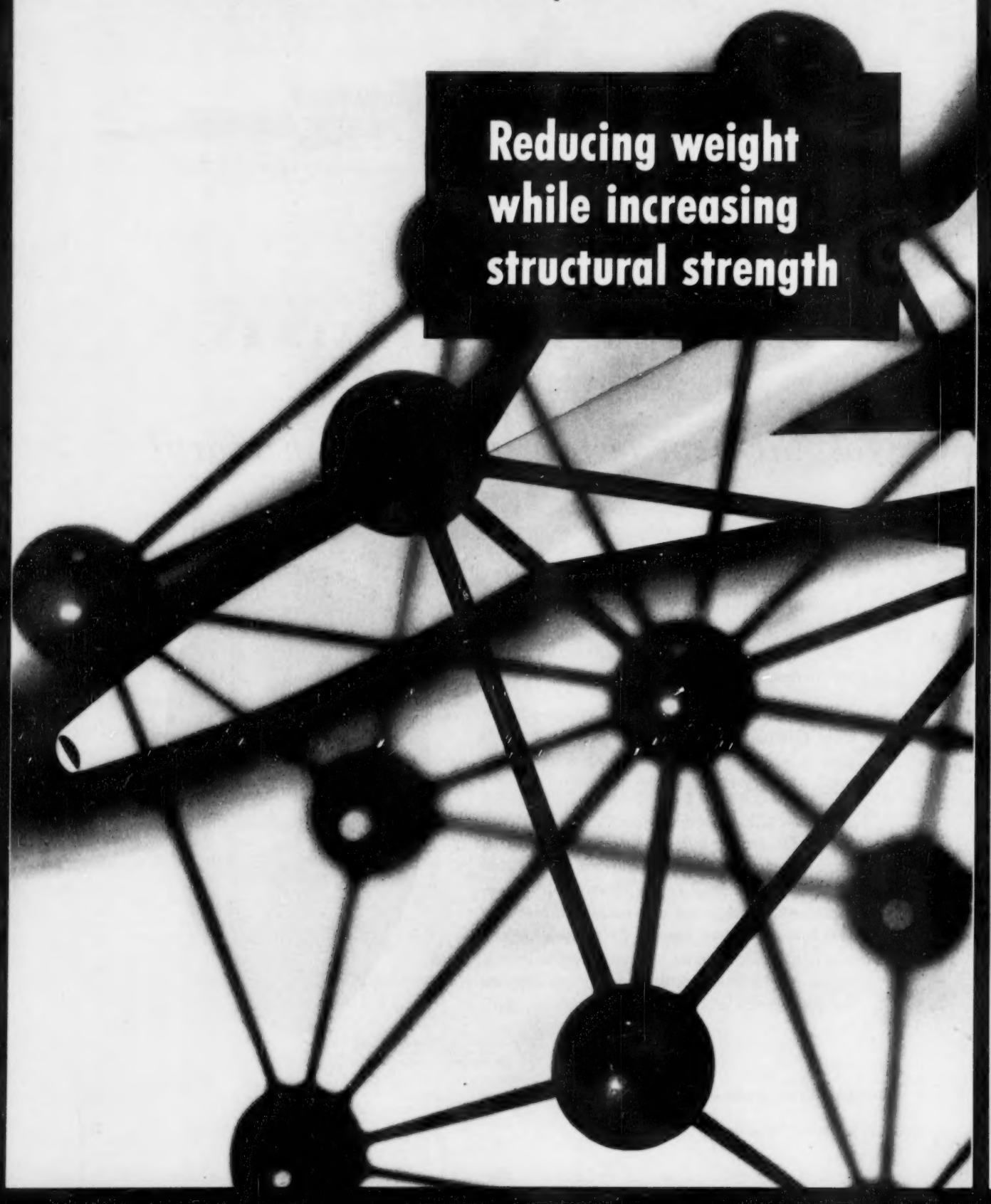
It has been the privilege of the Champion Spark Plug Company through its engineers to work closely with the engineering and maintenance staffs of every major airline.

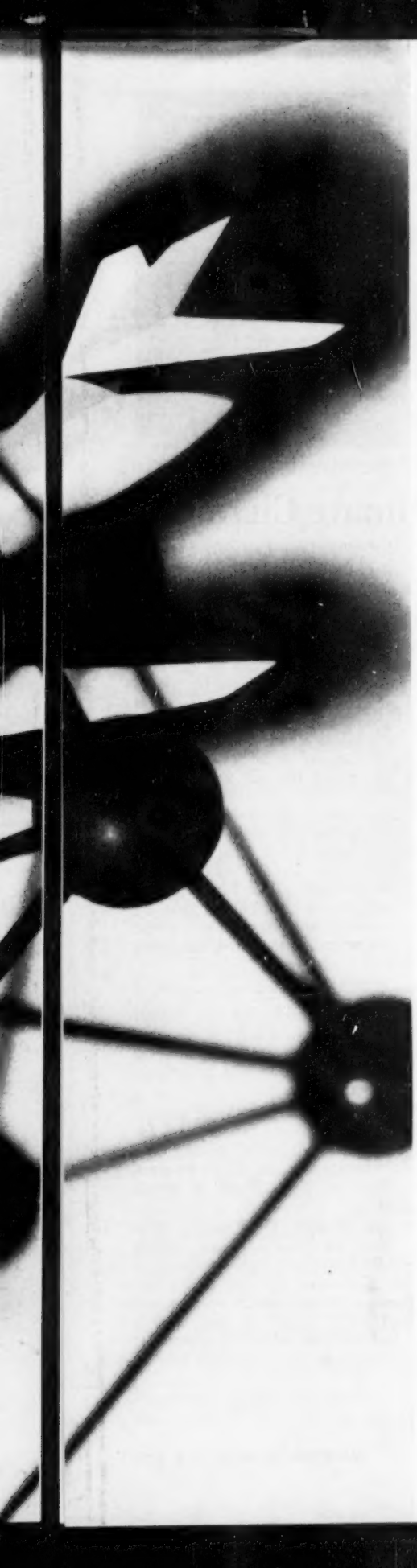
Whatever part Champion Spark Plugs have contributed to greater flying safety is attributable in large measure to the wholehearted cooperation of airline and aircraft engine manufacturing personnel with each other and ourselves. Nowhere is this more evident than in the annual Aircraft and Ignition Conference, sponsored by Champion, which has become the standard of the industry for cooperative effort towards a common goal!

The RC26S and R37S-1 are the most widely used of Champion's many types of aircraft spark plugs.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

TOMORROW'S AIRCRAFT: *One step closer*





New miracles with alloys are today overcoming one of the greatest problems that ever confronted the aviation industry . . . *ever-increasing plane weight*. As faster and faster speeds were demanded, larger and more powerful engines required, stronger and heavier airplanes became necessary. But Westinghouse engineers had foreseen the difficulties that increases in body and engine weight would bring . . . and their years of metallurgical research and plastic studies had the answers—Titanium and Micarta.

After successfully introducing the use of Titanium for jet engine parts, Westinghouse engineers doubled their efforts to further its application. Today, a saving of over 200 pounds has been made possible in the weight of each engine. Still further savings are being attested with alloys of this miracle metal that boasts greater tensile strength, up to 750° F, than even stainless steel.

At the same time that Westinghouse was unfolding the merits of Titanium to the aviation world, their manufacture of Micarta plane parts was proving almost equally valuable in reducing weight, while increasing structural strength. Research on this "lighter-than-aluminum" material and on its further use, other than items such as pulleys, cams, structural members and assemblies, continues without a stop.

Reducing weight and increasing structural strength with these new materials are but two of the hundreds of aviation developments under way in Westinghouse plants and laboratories the country over. Every day some new product, engine or material from one of the plants is announced . . . some new record is set . . . some new goal achieved. Every day more and more eyes are turning to the name Westinghouse for promise of tomorrow's faster, safer, more economical air transportation. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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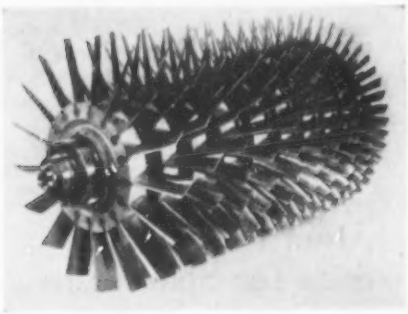

Use of Titanium in jet engine compressors like this, allows reduction in weight while increasing the structural strength.

THE SCOPE OF WESTINGHOUSE IN AVIATION

Basic aircraft systems

Turbojet Engines, Fire Control, Radar, Autopilots, Communication Equipment and Electrical Systems.

Ground equipment

Wind Tunnels, Airport Lighting, Industrial Plant Apparatus.

Air-borne system components

Transformers, Rectifiers, Instruments, Gyro-motors, Temperature Control Panels, Generating Equipment and System Control, Circuit Breakers, Contactors, Motors, Actuators and Hoists, Electronic Tubes, Magamps*, Micarta*.

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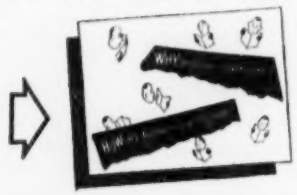

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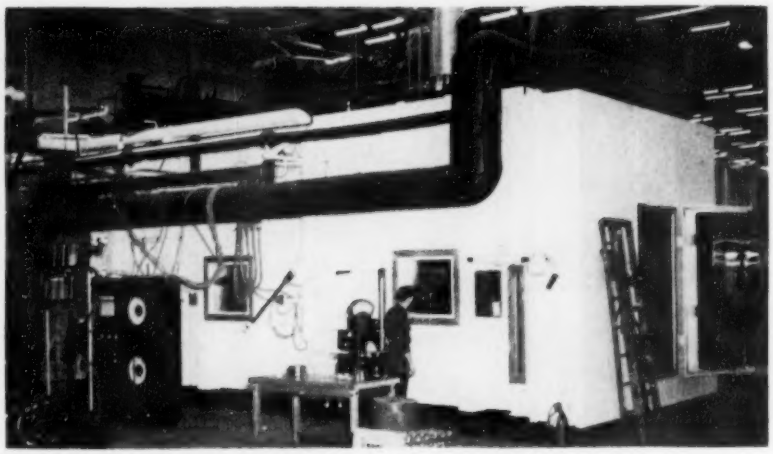

McDONNELL ALTICHAMBER simulates altitude-temperature operations.

McDonnell Adds Climate Chamber

Effects of heat, cold and altitude on aircraft equipment and systems will be pinpointed in a new test chamber recently completed at McDonnell Aircraft Corp., St. Louis.

Elementary tests in the Altichamber already have been run with F2H-3 Banshee components—a control system bellows, stall warning stick shaker, valves and instruments. Preparations are being made to check larger units such as a mockup of the plane's entire control system.

The chamber will simulate altitudes up to 70,000 ft., but actually has been brought to 100,000 ft. to test the unit's strength. Temperature range of the facility is from −100 to 165F, and relative humidity can be controlled from 15 to 95% at dewpoint temperatures above 35F.

In addition to basic functioning of equipment, studies will cover effects of repeated operations under varying conditions of heat, cold and pressure and will determine which materials stand up best under those operational conditions.

► **Three Units**—There are three separate chambers where tests can be run concurrently. One section may be operating at 165F, while another is at −65F, and the third depressurized to an equivalent of 70,000 ft. The main section and its adjacent chamber may be merged through removal of a panel.

Main chamber measures 20 ft. long, 11 ft. wide and 9 ft. high. The second (adjacent) room is 5 ft. long. The third chamber is considerably smaller, used as a pass-through airlock for personnel, small objects. It also will be used for tests on small equipment, which would not be economical to run in the larger sections.

Atom Fusion Engine Seen for Spaceships

One possible type of spaceship powerplant could be an atomic fusion reactor, according to Dr. J. H. Fremlin, of Birmingham University, Great Britain.

Such a power package might weigh over 4,000 tons and require a spherical container over 300 ft. in diameter, Dr. Fremlin told a recent meeting of the British Interplanetary Society. Being of such dimensions, the engine would necessarily be used on very large spaceships.

► **Nuclear Applications**—Considering the application of nuclear energy to rocket powerplants, Dr. Fremlin said that it would not be impossible, but merely difficult.

In the next decade he expected that it should be possible to get orbital rockets using chemical fuels. When that stage is reached, then the application of nuclear energy becomes promising, he said.

The reason is that low-thrust rockets, with low accelerations can be used for such orbits for long periods of time, and nuclear energy may be easier to work into these particular kinds of rocket engines.

As one example, Dr. Fremlin chose the proposed "ion" rocket, which would be driven by a high speed stream of electrical ions. He said that a fast plutonium reactor could be used to heat helium, which would in turn drive a gas turbine plus electrical generator. From the generator would come the ion beam.

Dr. Fremlin felt that a 100-ampere beam of mercury ions could be ob-

tained this way, and accelerated through a potential difference of 250 kilovolts. Small thrusts would be useful; they would be limited only when the extra weight of food to be carried due to the length of the voyage outweighed the fuel saving of the lower thrust.

▶**Fusion Reactor**—The fusion reactor which Dr. Fremlin described for the spaceship powerplant would be a gaseous type. It would use the thermonuclear reaction of deuterium to get helium and tritium. The reaction would take place at the center of a 4,000-ton sphere 100 meters in diameter, and be contained within a volume of 6 meters diameter.

The sphere would be filled with deuterium gas at 10 atmospheres pressure. Reaction would be started with a high-temperature electrical discharge. In the reaction area, temperatures would be up around 4 million degrees Centigrade, but would drop off to only several hundred degrees C at the surface of the sphere.

Power would be taken from the surface in the form of heat and the rate would be about one kilowatt per square centimeter of surface area.

It might be possible, said Dr. Fremlin, to use the sphere directly as the combustion chamber of a rocket engine, but this would depend on knowledge of the behavior of gas flow at the very high temperatures involved.

Fremlin assumed that the sphere would be constructed of stainless steel.

Navy Contracts

The following contracts were announced recently by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11.

Sperry Gyroscope Co., Div. of Sperry Corp., Great Neck, L. I., N. Y., bearing, 32,000 ea., $42,880.

Goodyear Aircraft Corp., 1210 Massillon Rd., Akron 15, spares for maintenance of 2P2K-3K airships, $123,738; envelope, airship, 1 ea., $299,214.

Aluminum Co. of America, 1200 Ring Bldg., Washington 6, D.C., aluminum alloy, $152,315; tubing, $29,567.

Goodrich, B. F., Co., 500 S. Main St., Akron 18, lifeboat, 310 ea., $194,353.

Transitron, Inc., 154 Spring St., New York 12, signal generator equipment spares, 400 ea., $454,890.

United Aircraft Corp., Pratt & Whitney Aircraft Div., East Hartford 8, Conn., spare parts for P&W engines, $106,369; spare parts for J57-P1 engines, $33,321; spare parts for use on HSD propellers, $1,560,754; spare parts for P&W engines, 530 ea., $42,665, $112,799, $171,541, $377,339, $622,552, $1,041,202, $294,197; parts for P&W reciprocating engines, $28,425.

United Aircraft Corp., Hamilton Standard Div., East Hartford 8, maintenance parts for use on pump assemblies on various aircraft, $41,237, $518,021; maintenance parts for propellers & de-icers, $818,660; spare parts & components covering C-119F aircraft propeller equipment, $3,241,992; parts for maintenance of integral oil control assembly for T-36 aircraft, $1,159,767; maintenance of integral oil controls for C-97 aircraft, MIPR, $4,253,097.

Westinghouse Electric Corp., Aviation Gas Turbine Div., Lester Branch Post Office, Philadelphia 13, maintenance parts used on J40-WE22 engines, $82,881.

Cook Paint & Varnish Co., 1412 Knox St., N. Kansas City, Mo., enamel, 25,000 gal., $38,750.

Hughes Aircraft Co., Div. of Hughes Tool Co., Culver City, parts for aviation armament, $823,962.

Adel Div., General Metals Corp., 10777 Van Owen St., Burbank, valve assembly, $30,012.

Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, valve assemblies, $210,862.

Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, phenol, 213,600 lb., $40,050.

Lavoie Labs., Inc., Matawan-Freehold Rd., Morganville, N. J., oscilloscope & spare parts, $67,782.

Greer Hydraulics, Inc., 454 Eighteenth St., Brooklyn 15, stand, 10 ea., $26,250.

Wood-Treating Chemicals Co., 5137 Southwest Ave., St. Louis 10, wood-water repellant compound chlorinated phenols, 52,000 gal., $26,290.

Szekely & Associates, Inc., O. E., 5312 Westminster Ave., Philadelphia 31, spindle & turner assembly, $26,927.

National Lead Co., 2607 E. Cumberland St., Philadelphia 25, pigment, 1,320,000 lb., $214,160.

Farley & Loetscher Mfg. Co., 916 Commercial Trust Bldg., Philadelphia, insulating material, $30,373.

Albert & J. M. Anderson Mfg. Co., 289 "A" St., Boston 10, receptacle, $37,560.

Irwin Paint Co., Fourth & Addison Sts., Berkeley, Calif., paint, camouflage, $52,293.

Phelps Dodge Copper Prod. Corp., Habirshaw Cable & Wire Div., 40 Wall St., New York 5, cable, watertight, $1,789,151.

Bendix Products Div., Bendix Aviation Corp., South Bend, 20, Ind., spare parts for R4360-59B aircraft engine, $1,640,534; carburetors, $773,809; maintenance parts used on carburetor assemblies, $33,342.

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Gavco Develops New Regulator

Rugged improved unit maintains constant voltage in small alternators, uses sealed plug-in subassemblies.

By Philip Klass

Gavco Corp. of New York has developed a new environment-proof, easy-to-service version of its older electronic voltage regulator, which the Air Force has been using to maintain constant voltage in small alternators that supply a.c. power for windshield de-icing and radar on the B-47, B-45, B-50, C-97 and C-124.

Gavco, building 10 prototype units for Navy evaluation, says one of its new Model 13RG-B regulators has racked up more than 100 hours of flight test time at the USAF's Wright Air Development Center in Dayton.

The new Model 13RG-B weighs 25 lb., roughly the same as the older 7RG and 7RG-B models of which Gavco has produced about 7,000 for the Air Force. The new model, however, employs hermetically sealed plug-in sub-assembly construction and, in addition, has several new operational features. These are:

- Over-voltage protection.
- Automatic fault clearance.
- Electrical "cushioning" for thyraton tubes.

▶ **Operation**—The Gavco regulator is designed for use in aircraft power systems in which each of several small, single-phase alternators operates independently. Each alternator feeds its own separate power bus and loads. The regulator continuously controls its alternator's output, normally set at 115 v.

When alternator voltage varies from the pre-set value, the regulator automatically increases or decreases current flowing in the field winding of the alternator's exciter, which in turn increases or decreases alternator field current to return the voltage to its original value. (The exciter is a small d.c. generator driven from the alternator's rotor shaft that amplifies regulator output sufficiently for use in the alternator's field windings.)

▶ **Performance**—Gavco says its new 13RG-B regulator will maintain alternator output (steady-state) voltage constant over the alternator's 380 to 980 cps. frequency range within:

- **2 Volts,** from no load to 100% load.
- **2.8 Volts,** from no load to 175% load.

The Gavco regulator uses two thyratron-type tubes connected in a full-wave rectifier circuit to control average current flowing in the exciter field winding. Firing point of the thyratrons, which determines the average exciter field current, is controlled by the magnitude of the alternator's output voltage.

The regulator consists of four major plug-in type sub-assemblies, each of which are hermetically sealed for protection against moisture. The interconnecting wiring between subassemblies is also a resin-cast replaceable assembly.

▶ **Over-Voltage Protection**—The new regulator has a builtin over-voltage detector designed to protect equipment operating on the a.c. bus. If a malfunction should cause the alternator voltage to rise to 130 v. for more than approximately 0.2 sec., a relay picks up and removes alternator excitation.

The regulator and alternator can be returned to service by pushing a reset button; if over-voltage still exists, the regulator will again trip out.

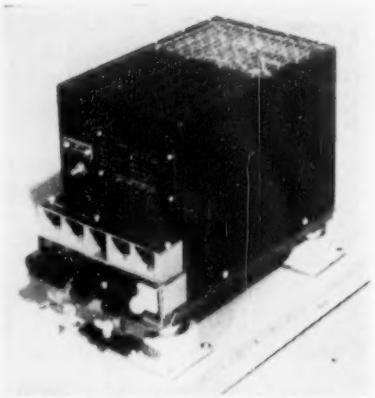
▶ **Fault Clearance**—If a short circuit occurs across an a.c. bus, it is desirable to try to "burn clear" the fault so that other equipment can continue to operate. When such a fault occurs on a bus fed by a single alternator, voltage drops sharply. Because the alternator regulator operates from this bus voltage, regulator output (field excitation) falls, further reducing alternator voltage. This makes it impossible to burn clear the fault.

If there is a second (independent) a.c. supply, the faulted bus regulator can be switched to the second alternator to obtain operating power. This enables the faulted bus regulator to supply the large field excitation currents needed by the faulted alternator if it is to try to burn clear the fault.

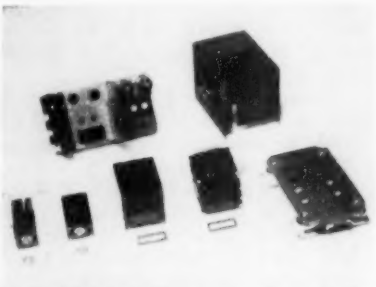
The new Gavco regulator is designed to switch automatically to a second a.c. source (if present) for its supply power in the event that a short circuit occurs across its own bus. If the fault is cleared promptly, the regulator automatically returns to its own a.c. bus for power; if not, the regulator shuts itself down, Gavco says.

▶ **Electrical Cushioning**—Gas-filled thyratrons perform more like on-off switches than conventional vacuum tubes. Thyratrons are either completely non-conducting or full-conducting. At the point where the gas in the tube ionizes, thyratrons "fire with a bang." This creates high transient voltages that tend to reduce thyratron life.

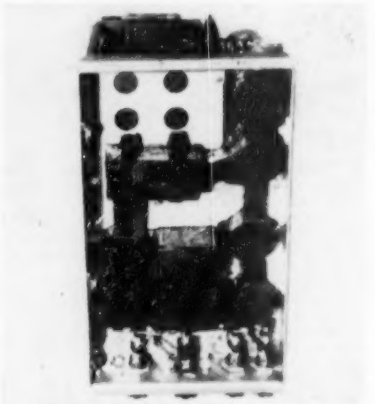
Gavco says it has introduced "electrical cushioning" for its regulator thyratrons by means of an R-C (resistor-capacitor) network between the thyratron plate and cathode. As a result, Gavco expects thyratron life to exceed 500 hrs. One set of tubes under test reportedly lasted for 800 hrs.



NEW STURDY VERSION of Gavco's electronic voltage regulator, used to maintain constant voltage in small aircraft alternators . . .

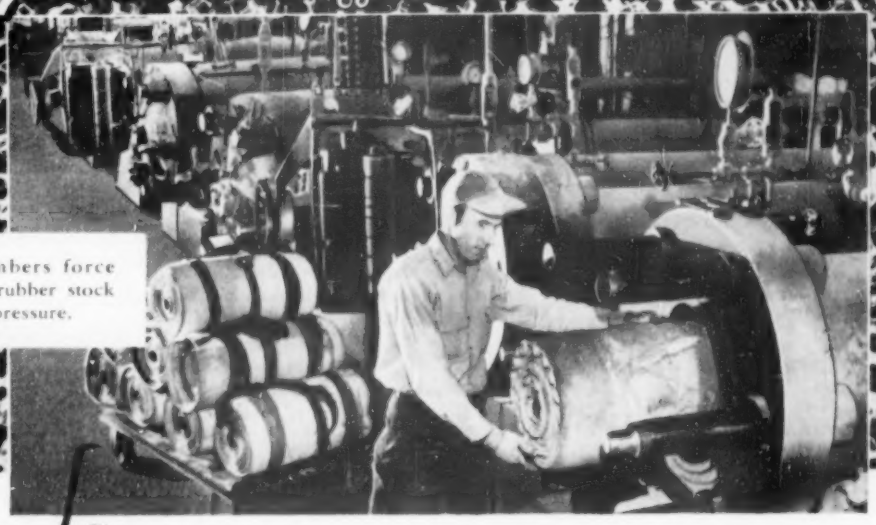


IS CONSTRUCTED with hermetically-sealed plug-in subassemblies to simplify maintenance and protect against moisture.



EVEN INTERCONNECTING wires (shown in underside view above) are potted in resin and can be removed as a complete assembly.

We're forever blowing nitrogen bubbles into RUBATEX



Gassing chambers force nitrogen into rubber stock at 5,000 lbs. pressure.

Closed cells are responsible for the structural strength and superior physical properties of Rubatex — not possessed by ordinary sponge rubber with open coarse cells which are wide open to oxygen and moisture.

Nitrogen, with all the advantages of air without its harmful effect, is blown into "precured sheets" of rubber under a pressure of 5,000 p. s. i., to give RUBATEX its unique, very low density, closed cellular structure that shuts out oxygen, dust, moisture, and acts as a barrier against temperature extremes.

These millions of permanently sealed nitrogen bubbles give RUBATEX a superior lead over sponge and other soft rubber materials with open interlinked cells that are exposed to oxygen, the "bugaboo" of rubber.

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CONSTRUCTION

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- Weather stripping

INDUSTRIAL

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- Moisture-proof seals
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REFRIGERATION — Gasketing for refrigerator and cold storage room doors.

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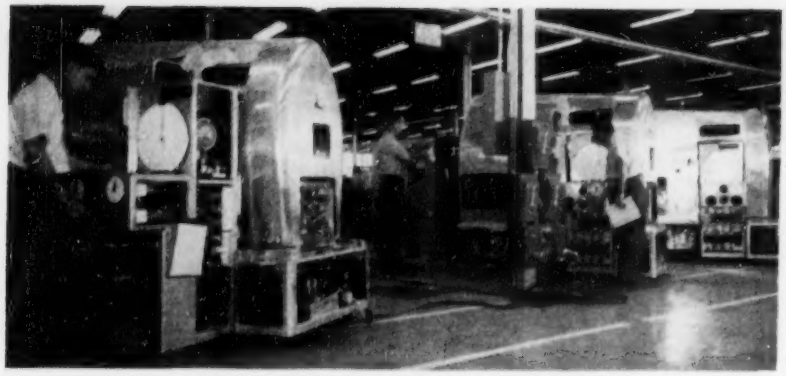
RUBATEX CLOSED CELLULAR RUBBER

PIONEER MANUFACTURER OF CLOSED CELLULAR RUBBER ©



AIR FRANCE'S FLIGHT TRAINER

Curtiss-Wright assembly line works on electronic flight trainers of the type recently purchased by Air France for refresher training of pilots in navigational procedures. Air France, reportedly the first foreign carrier to buy such equipment in the U. S., will install the flight simulator at its Orly Field base, near Paris. Trans World Airlines has also ordered C-W trainers, plans to install them at seven training centers.

FILTER CENTER

▶ **Navy Fighters to Get RMI**—Radio magnetic indicators (which provide combination of dual ADF and magnetic heading information) will go into Navy fighters for the first time, eliminating the panel-mounted gyro compass. First RMI installations, slated for the Douglas F4D and North American FJ-2, will use a new Sperry remote gyro compass, designated Type S-2.

▶ **GE Develops Remote Gyro Compass**—General Electric, whose G-2 panel-mounted gyro compass is being displaced by Navy switch to radio magnetic indicators in its new fighters, has developed a new low-drift remote gyro compass system suitable for RMI operation. System, which weighs about 20 lb., is at present under test at Navy's Airborne Instruments Lab in Philadelphia.

▶ **Avionics High in Top Defense Firms**—Fifteen of the 100 companies which received the largest amount of military business since the start of the Korean war are in the avionics and electronics business (AVIATION WEEK Jan. 26, p. 19). Eight of these 15 firms were not in the select "100" during World War II. Hughes Aircraft, now in the 22nd position, and Collins Radio, now in the 40th spot, head the list of avionics newcomers to the top 100. Other newcomers: Hazeltine, Sylvania, Minneapolis-Honeywell, Admiral, Gilfillan, and Motorola.

▶ **Lockheed Buys New CRC Computer**—Lockheed Aircraft Co. has purchased a new automatic digital computer for use in Constellation gust response studies and for other airplane design problems. The new computer, whose official name is the CRC 105 Electronic Digital Differential Analyzer, is being produced by the Computer Research Corp.

▶ **Radar Report Favors 5.7 Cm.**—Preliminary report by McGill University's Dr. J. S. Marshall to Aeronautical Radio Inc. committee preparing spec for an airline weather surveillance (storm warning) radar indicates a marked advantage for the 5.7-cm. (wavelength) over the widely used X-band (3.2 cm.). Marshall's study confirmed that 5.7-cm. radar would suffer much less attenuation (reduction of useful range) than 3.2-cm. radar under rainfall rates likely to be encountered in storms.

UNDER INSPECTION

Microscope inspection is used to assure reliability of special-purpose vacuum tubes used in autopilots, radar, and other avionics equipment by Bendix Aviation's Red Bank division at company's new Eatontown, N. J., plant.

▶ **M-H at Work on New "Helipilots"**—Minneapolis-Honeywell, whose E-12 autopilot will be used on the Piasecki H-21 and HUP-2 helicopters, is developing two more-advanced, lighter-weight helicopter autopilots. One, the MH-18, is sponsored by Piasecki; the other, the H-21, is a Wright Air Development Center program. In both new systems, the human pilot will introduce autopilot maneuvers through his regular cyclic control stick. A differential-type autopilot servo installation will isolate the cyclic control stick from servo control motions.

▶ **Navy UHF Progress**—Approximately 25% of Navy's aircraft are now equipped with new ARC-27 UHF communications set, replacing previously used VHF. Another 50%, now using VHF, have the necessary UHF wiring and equipment brackets installed and are awaiting availability of UHF equipment. Navy spokesman says that UHF has given no more maintenance problems than were encountered in using VHF.

▶ **N. Y. ARTC Expands Remote VHFs**—The New York Air Route Traffic Control center plans to install a remote VHF station at Barnegat, N. J., similar to stations now in operation at Scranton and Westchester, Pa. (AVIATION WEEK Jan. 26, p. 38). Barnegat VHF is slated for operation within 60 days at 118.9 mc., handling incoming traffic on Green 5 and Amber 9 airways.

▶ **New Technical Bulletins:**

- **Tube characteristics** of General Electric's Five-Star line of high-reliability miniature and sub-min vacuum tubes are described in publication ETD-548-A. (Tube Dept., 1 River Road, Schenectady 5, N. Y.)
- **D.C. solenoids** in 82 different shell diameters and in 25 different coil windings are described in detail in bulletin DCS3-1952. (Cannon Electric, Catalog Dept., 420 West Ave. 33, Los Angeles 31, Calif.)
- **High-temp capacitors** of the impregnated metallized-paper type, capable of operation at temperatures of −55 to 125C, are described in new Aerovox Corp. bulletin HTMP252. (New Bedford, Mass.)
- **Magnetic amplifiers**, their application and typical specifications, are listed in brochure available from Karl-Douglas Associates. (3160 W. El Segundo Blvd., Hawthorne, Calif.)
- **EASE analog computer**, its application and features, are described in Data File 309-67 available from Beckman Instruments, Inc. (South Pasadena 1, Calif.)
- **Copper oxide rectifier** characteristics and applications are described in a new General Electric bulletin, GEA-5699A. (1 River Road, Schenectady, N. Y.)

New Valve Simplifies Hydraulic Systems

- **One-body pump control cuts number of parts.**
- **Vickers unit developed for Super Connies.**

Vickers, Inc., and Lockheed Aircraft Corp. have developed a simple pump control valve for use in late model Super Constellations.

Vickers says that the new control valve will:

- **Reduce** considerably the number of separate units in an aircraft's hydraulic system.
- **Eliminate** four electrical switches.
- **Cut** replacement procurement costs by about 66%.
- **Give** significant weight saving.

Purpose of the valve is to unload automatically an aircraft's hydraulic pump delivery at low pressure into the pump's suction side when fluid temperature reaches a pre-determined maximum figure.

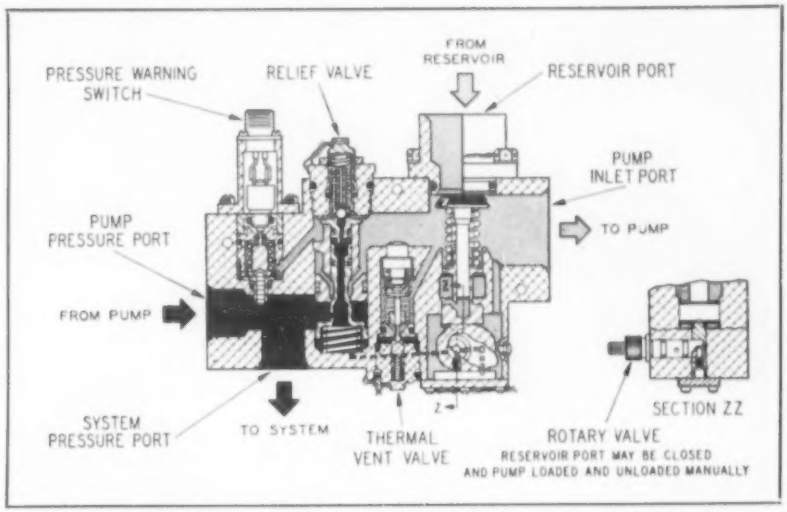
▶ **"Unlimited" Operation**—Vickers says the valve will "permit unlimited operation of hydraulic pumps in the shut-off position without damage," and the struction line will not collapse when the pump is shut off.

In one body, the Model AA-40510 pump control valve contains these units: pressure warning switch, pressure relief valve, thermal vent valve, and a rotary valve that serves as the pump's suction shutoff and firewall shutoff valves.

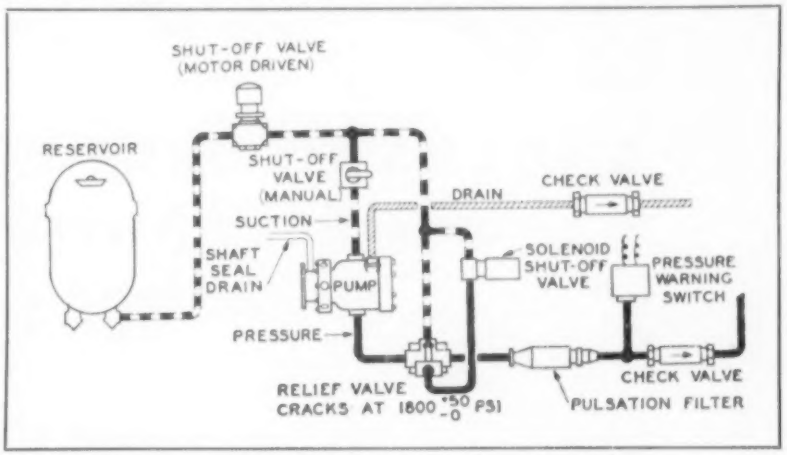
When the reservoir port is closed, pump may be loaded and unloaded manually.

While Vickers and Lockheed were developing the new valve, Chicago & Southern Air Lines came up with what they considered a simple, easy and inexpensive modification that called for mounting the relief valve directly on each pump. But C&S cancelled the modification after Vickers had approved it and the engine manufacturer had agreed to the additional engine overhang moment on accessory sections required by the change.

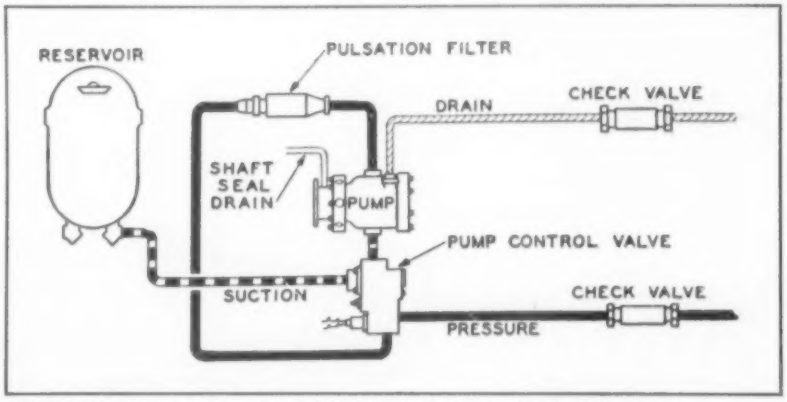
Because of extensive plumbing, wiring and control revisions, Vickers says the pump control valve change is not desirable as a field modification. The change may prove worthwhile at a major overhaul period, however, a spokesman for a large airline suggests.



INSTALLATION of Vickers pump control valve in late model Super Constellation . . .



CLEANS UP basic pumping circuit of airliner's hydraulic system, allowing . . .



REDUCTION of separate units and electrical switches needed by old version.

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LAS to Operate Big Idlewild Base

Lockheed Aircraft Service-International has signed a 20-year lease to operate a new $2.7-million aircraft overhaul hangar scheduled for completion this year at New York's Idlewild International Airport.

The project will be the largest independent aircraft maintenance base on the East Coast, covering 90,000 sq. ft. on a 25-acre area.

Constructed by the Port of New York Authority, the cantilever-design hangar (AVIATION WEEK Feb. 9, p. 69) will more than triple the space which is at present occupied by Lockheed at Idlewild.

LAS president J. Kenneth Hull says $700,000 in maintenance equipment will be installed in the hangar this year and an additional $150,000 in improvements and new equipment will be installed in 1954.

► **Complete Facilities**—Five bays of 133 x 133 feet will be capable of housing the largest commercial air transports now flying or projected, Hull says. Offices and shops will cover 68,000 sq. ft.

Plane ramps will take up 11 acres of the maintenance base.

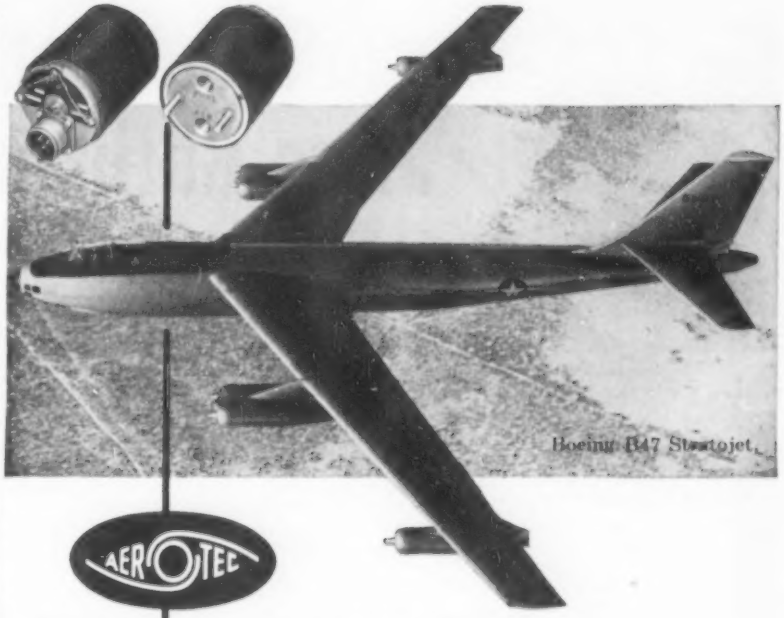
The new installation will maintain, modify, convert and overhaul commercial aircraft and corporation-owned planes.

The aircraft component and accessory repair shops will include instruments, radio and avionics, sheet metal, trim, electrical, hydraulics, paint, welding and engine buildup.

OFF THE LINE

A $300,000 contract for 9,000 Martin PBM Mariner exhaust stacks and support assemblies has been received from the Navy by Solar Aircraft Co. The stacks will be made of stainless steel and ceramic-coated to give them a service life of more than double the current coated mild-steel units. Some 30 stacks will be used on each PBM. Shipments will start in May.

A team of two Sperry Gyroscope field engineers are currently touring 31 Pan American World Airways stations in Europe, Africa, the Middle East, India and the Far East, giving on-the-spot instructions to PAA line personnel concerning Sperry flight instruments and controls used on the airline's DC-6B Clippers. Classroom and on-the-job instruction will be given for such instruments as A-12 autopilots and associated automatic approach controls, engine analyzers, Zero Readers, Gyrosyn compasses and H-5 gyro-horizons.



AERO TEC

M818 DIFFERENTIAL PRESSURE SWITCH

Specified by Boeing Engineers for the Boeing B47

Manufacturers like Boeing find Aerotec Pressure Switches built to exacting specifications for aircraft such as the B47 Stratojet, where performance qualifications are most demanding.

Now in production, Aerotec M-818 is vibration resistant up to 500 cps with 10 g's acceleration. It is capable of withstanding surge pressure of 120 psi., without change in setting. Rated for 28 volts DC, 3 amperes inductive, up to 45,000 feet.

All M800 series Aerotec switches are available for use with liquid oxygen, water, alcohol, octane fuels and hydraulic fluid.

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World's Busiest Airport Praises Gilfillan GCA Radar

"...the biggest advance ever taken to control aircraft safely and expeditiously,"

says Clarke L. Croft, Chief Airport Traffic Controller.

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DEPARTMENT OF COMMERCE
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IN REPLY REFER TO
FILE

CIVIL AERONAUTICS ADMINISTRATION
Airport Traffic Control Tower
Cleveland (Hopkins) Airport
Cleveland 11, Ohio

December 9, 1952

Mr. Warren C. Miles
Export Sales Manager
Gilfillan Bros., Inc.
1815 Venice Boulevard
Los Angeles 6, California

Dear Warren:

It was a pleasure to get your note, and I am most happy to forward a few comments regarding Gilfillan ASR-1 and PAR-1 to you.

The installation of radar at Cleveland Hopkins Airport was the biggest advance ever taken to control aircraft safely and expeditiously. According to our records, of the total instrument approaches made here, we average 50%, plus or minus very little from month to month, of the approaches made utilizing radar only. Of the 50%, at 95% are surveillance approaches. If we have surveillance minimums, we never go to precision because our prevailing wind is southwest. The operators feel bad if they have an aircraft more than 100 feet right or left of the runway at one mile on surveillance runs, even though the equipment isn't designed for that accuracy. The accuracy of the PAR-1 is remarkable. We have never had any failure of equipment during instrument weather. A few minor changes in location of controls on the ASR-1 should be made with which, I'm sure you are familiar.

Again, may I say, we are very happy with the Gilfillan equipment. We believe we make more use of radar than any other location, and have practically eliminated delays to arriving aircraft. I'll be looking forward to your next visit.

Very truly yours,

Clarke L. Croft

Clarke L. Croft
Chief Airport Traffic Controller

CLC:no

Civil Aeronautics Administration reports that during the last fiscal year CAA control towers handled a record 16,673,562 landings and takeoffs. Busiest of all was Cleveland tower, with a total of 327,943 operations.

Gilfillan is the only GCA radar in operation at CAA airports in the United States.

Gilfillan is exclusive supplier of latest, proven, GCA radar to the USAF, USMC, USN and the air forces of England, Canada, Italy, Australia, Belgium, Denmark, the Netherlands, Norway, Portugal and the Union of South Africa.

Only Gilfillan GCA Radar is standard equipment among 24 nations of the free world.

There can be no substitute for Gilfillan's 40 years of highly specialized experience.

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the FIRST name is *Gilfillan*

Los Angeles

GCA

NEW AVIATION PRODUCTS

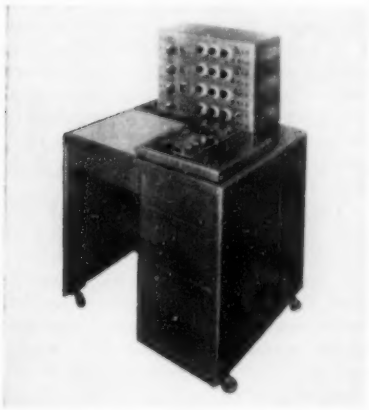
Isolation Amplifier

An isolation amplifier for aircraft, permitting selection of eight receiver outputs and three transmitter circuits, has been placed on the market by Aviation Accessories Inc.

The unit, Model A. 100, also provides interphone service and a call system between all crew members. It allows any combination of the eight receivers and interphone to be selected without affecting the communications or selection of other crew members.

Priced at $275, it weighs 3½ lb., is a self-contained system requiring only a microphone, headset and a standard range filter to make it a complete installation. The unit is mechanically and electrically interchangeable with similar boxes in use.

Aviation Accessories Inc., P. O. Box 4178, Fort Worth 6, Tex.



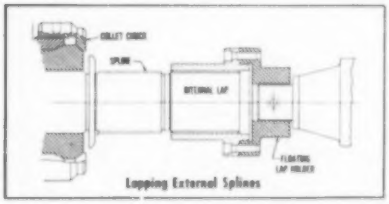
Recording Console

An expandable console for recording oscillograph data has been announced by Edin Co., Inc.

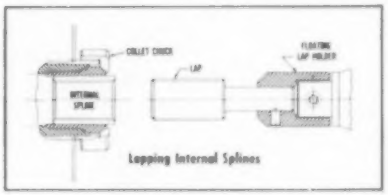
The equipment includes an oscillograph recorder mounted in the desk-like Consolette and amplifiers (a.c., d.c. or carrier types) in a JAN rack or panel arrangement on top of the desk.

The recorder can be expanded from a two-channel system to four or six channels by adding ink-writing galvanometers and amplifiers as the need arises. The recording galvonometers cover a frequency response up to 300 cps. Chart paper can be operated at speeds from .1 mm./sec. to 625 mm./sec.

Edin Co., Inc., 207 Main St., Worcester 8, Mass.



Lapping External Splines



Lapping Internal Splines

Spline Finisher

A new method of lapping (smooth-finishing) small shaft splines is said to succeed where conventional techniques fail.

It involves the use of a toothed lap, which fits into the spline and reciprocates back and forth to produce a high finish.

This is in lieu of normally used lapping wheels, its developer, Michigan Tool Co., says.

The lapping tools can be used with either the Michigan Model 996 or 998 internal gear-lapping machines.

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

Plexiglas Coating

A protective coating for Plexiglas canopies and windows during aircraft degreasing and painting has been placed on the market by Chemical Development Co.

The material, called CD Strip A, jells within two or three minutes after application and can be peeled off. The coating will not craze Plexiglas and is not affected by toluol, methylene chloride and other solvents generally in use, the company says.

The product also may be used to protect aircraft components during shipment and as a masking agent in cementing, machining and bonding of parts on

ENGINEERS-

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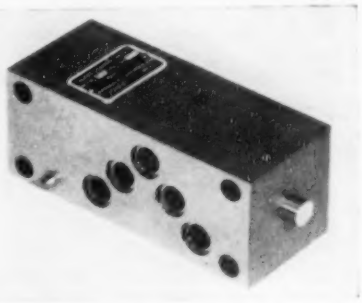
production lines, the firm claims.

Chemical Development Corp, Danvers, Mass.



Booster Valves

Control valves for follow-up boosters in positioning systems that operate at pressures up to 3,000 psi. are being produced by Hydraulic Controls Co.

They provide linear flow output and are supplied for either manifold mounting or threaded for pipe or AN tube fittings.

The units use Nitralloy moving parts designed to give long life and smooth operation. When small forces are used to actuate the valves (such as low power motors driving cams) normal stroking forces in the units may be reduced to only light spring action to keep the piston in contact with the cam.

Hydraulic Controls Co., 87 Terrace St., Roxbury 20, Mass.

Torque Limit Wrench

A new wrench that limits applied torque has been put on the market.

The wrench, jointly developed by Richmont, Inc., and Plomb Tool Co., has a built-in torque-limiting device that releases automatically at the proper setting. The tool uses a micrometer-type adjustment for accurate setting and an enclosed precision spring under compression as the main torque-limiting element.

The makers point out that the wrench, available in either plain-head or ratchet-head models, may be used anywhere an ordinary wrench may be used, but has the torque-limiting feature as an added advantage. Capacities of the torque wrench are 5-75 ft. lb., and 10-150 ft. lb. Drive sizes are $\frac{3}{8}$ inch and $\frac{1}{2}$ inch.

Richmont calls the new tool Hi-Lo-Torq, and will sell it direct to aviation and other consumer accounts it has serviced in the past. Company address: 808 W. Santa Anita, San Gabriel, Calif.

The Plomb company, which makes parts of the tool, has the exclusive rights to sell the wrench, under the company trademark, Proto, to jobbers and distributors. Address: Plomb Tool Co., Los Angeles 54, Calif.

"He Might Need It..."

"He never was much for letter-writing when he was in college. But he must know how anxious Mother and I are . . . now that he's off in Korea. Haven't heard from him in six weeks. Of course, they say 'no news is good news' . . . but I wonder. Maybe he can't write . . . because . . . maybe he's in a hospital somewhere. And maybe he needs blood. I don't know . . . but I'm not taking any chances. That's why *I'm* giving blood."

★ ★ ★

Yes, all kinds of people give blood —for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a combat area, a local hospital, or for Civil Defense needs— this priceless, painless gift will some day save an American life!

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Business Executives!

✓Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed employees of your company's plan of cooperation?
- ☐ Was information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

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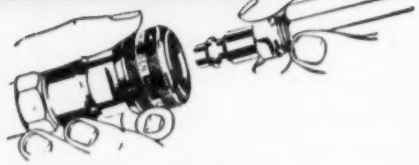
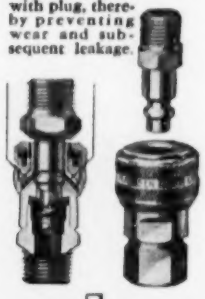


Locking pins in Hansen Push-Tite Coupling Socket afford large area contact with plug, thereby preventing wear and subsequent leakage.



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To disconnect, pull back sleeve on socket—coupling disconnects. Flow is shut off instantly and automatically. No tools—no turning, adjusting nor twisting of parts required.

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ALSO ON THE MARKET

Sturdy milling machine designed for heavy work ordinarily requiring larger machines has special construction features giving great rigidity, according to maker, Rotex Punch Co., 4726 E. 12 St., Oakland, Calif.

Deep freezers for cooling down to −70F in industrial applications are available in "unusually" compact designs that are made possible by improved insulation, according to maker. They come in various models with capacities from 1.5 to 5 cu. ft. Sub-Zero Products Co., 3930 Reading Rd., Cincinnati 29, Ohio.

Swivel-shoe set adaptable for various holding jobs with tools, jigs and fixtures save time by eliminating need for making shoes on the job and are designed to hold parts positively without marring or scratching. Allied Air Parts, 662 N. Robertson Blvd., Los Angeles 46, Calif.

Inserts for steel shelving, to adjust as desired for various tool crib arrangements, are available from Lyon Metal Products, Inc., Aurora, Ill.

Usefulness of old drilling and milling machines may be extended with Price adapters. These raise mill head, give it 180-deg. swing, providing more working space and permitting horizontal displacement of head, as well as angular drilling and milling, says maker, D. W. Price Corp., 11161 W. Pico Blvd., Los Angeles 64.

Smallest DPDT switch with simultaneous "make" and "break" action is what maker calls units for reversing single- and three-phase motors without use of relays, or isolating circuits of different voltages and many other services. Electro-Snap Switch and Mfg. Co., 4219 W. Lake St., Chicago.

Portable surface resistance indicator takes guesswork out of spotwelding; gives an accurate measurement of the resistance between pieces of metal to be resistance welded; will check enough pieces in 15 min. to last through a 12-hr. welding period, according to the developer, General Electric Co., Schenectady 5, N. Y.

Drilling machine produces as many as 120 parts hourly, with 32 holes each. Part is clamped and eight holes drilled simultaneously at each of four indexes, after which part is unclamped. Job is done with eight Model HH Govro-Nelson Automatic Drilling Units mounted horizontally on machine—Govro-Nelson Co., 1933 Antoinette, Detroit 8.

Why $12,000 to $20,000 Jobs Are the Easiest to Get Today

Here Are Some Surprising Facts About the Serious Shortage of High-Salaried Executives—and What You Can Do to Qualify for the Top-level Jobs That Are Open Right Now

SURPRISING as it may seem, the really big jobs today are the hardest to fill—and the easiest to get. You don't have to look farther than the want-ad columns to prove this fact for yourself. Men who can handle top-management jobs can now choose from any number of openings that pay $12,000 . . . $15,000 . . . $20,000, and more.

Such men are becoming hard to find. WHY? The acute shortage has been variously explained by the war years, the rapid expansion of industry, the tendency to specialize. The important thing is not why the shortage exists but WHAT you can do about it, and HOW you can qualify for the great opportunities that exist in business today.

As one of the foremost business consultants in the U. S. and the head of a large accounting firm, J. K. Lasser works with some of the nation's leading corporations. He has seen at first hand the scarcity of qualified men for high-salaried jobs. Why, Mr. Lasser asked, are there so many openings at the top—and so many men stymied in the $5,000 to $10,000 a year bracket?

The One Ingredient That Qualifies You for a Top-Salary Job

To find the answer, Mr. Lasser went directly to the heads of companies in many fields. Consistently he heard the same answer: the one thing men in the middle brackets need to make the high-salary grade is—a general, well-rounded knowledge of business procedure. "Give me a man with a basic knowledge of accounting, marketing, employee relations and taxation," one employer remarked, "and I'll lead him by the hand to a $20,000 office!"

J. K. LASSER

Featured in FORTUNE MAGAZINE as one of the nation's foremost authorities on business and taxes. Mr. Lasser is head of one of the best known accounting firms in the United States and Adjunct Professor and Chairman of the Institute on Federal Taxation at N.Y.U.

This simple answer gave Mr. Lasser an idea for a brand-new plan that would literally lead men out of the $5,000-$10,000 plateau and into the top jobs. He asked the foremost men in every field to reveal working methods that have brought success in marketing, public relations, accounting, budgeting, insurance, government regulations, taxation, and the "know-how" in every business procedure for top-level management.

Mr. Lasser consulted only top men, such as business analyst Roy A. Foulke, Vice-President, Dun and Bradstreet; marketing expert Marion Harper, Sr.; twenty executives nationally known for their successful methods. Then he simplified and "boiled down" this wealth of knowledge and experience into J. K. Lasser's Executive Course in Profitable Business Management—providing the all-important ingredient needed to boost men into the $10,000-plus bracket.

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You learn streamlined methods of distribution; how to run a cost system; how to design systems for internal control of business. Even hardboiled employers will be impressed by your knowledge of controlling operations through budgeting; how to avoid business frauds; and how to cut paper work in half. Your knowledge of new marketing methods, successful tax planning, and effective management under today's government controls can save and make money for any employer.

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If you're not *sure* of your own advancement, send for Lasser's Course right away. By looking at the whole Course—noting the ground covered, the fact-filled treatment, Lasser's clear, informative style—you can quickly see how this Course can prepare *you* for advancement—back you up with the best ideas of 21 leading business experts.

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NOTE TO EMPLOYERS: Mr. Lasser's new course is designed to help solve your problems in readying men for top-level openings in your organization. Send us the names and addresses of men working for you who merely need more background in sound business procedures to qualify them for bigger jobs. We will gladly mail a booklet to them, fully describing the course, without charge or obligation to you.

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CAA Airport Aid Fund Is Budget Target

- **Salary cuts also likely in paring of expenditures.**
- **But airways and facilities spending will not be hit.**

By Lee Moore

Civil Aeronautics Administration salaries and airport aid funds are prime targets of Commerce Department and Budget Bureau chiefs seeking to reduce the $1-billion expenditures proposed by former President Truman for Commerce Department agencies in fiscal 1954.

Budget officials find they may have to cut agency functions to make substantial immediate savings.

Federal airways operation and facilities establishment are considered relatively untouchable; therefore the main cuts may hit: the federal-aid airport program; plans for a new Washington Airport at Burke, Va.; Alaskan airports; control tower operation at smaller airports; special services, such as those rendered to private fliers; and safety inspection at less active airports. These are smaller items than the CAA airways budget, which dominates the CAA expenditures list, because airways are considered vital to military, airline and private aviation.

Across-the-board reductions of salary and expense also are considered likely. But officials concede that heavy cuts of this type would impair some CAA functions, because it will take time for the new Republican management to "eliminate waste."

► **Commerce Budget Problem**—Here is the biggest reason Commerce Secretary Sinclair Weeks and other officials want to take the bulk of reductions from CAA's budget, according to a responsible source.

Of the $1-billion Commerce expenditures originally planned by the Truman Administration, $750 million already has been appropriated by previous Congresses. Some comes out of prior year authorizations but most is for liquidation of prior years' contracts, which would be difficult to cut out now. That leaves $250 million of new money still to be appropriated for fiscal 1954 expenditures by Commerce agencies.

Of the $250 million, $113 million is earmarked for two CAA items: $108 million for CAA salary and expense and $5 million for federal-aid airport construction.

Cutting these CAA items won't be easy. But other Commerce agency reductions also are difficult, and none are as big as the $113-million target within the CAA budget breakdown.

Budget officials are giving closest scrutiny to the expenditures side of the budget. Expenditures determine new spending. So the GOP Administration is going after them first.

► **Other Commerce Agencies**—The Administration scissors group finds small pickings among most other agencies listed in the Commerce expenditures budget. The Maritime Administration shows $7 million marked for new ship construction in 1954. Weather Bureau's $27 million is almost all in salaries, and reductions would bring protest from farmers, airlines and many other vitally dependent users, and their congressmen.

In the Bureau of Public Roads, the two largest items are $12 million for defense access roads and $5 million for Inter-American Highway completion. In the Bureau of Standards' $9-million total new expenditures, the major item is $4 million for essential research and testing.

Also difficult to reduce are remaining CAA items such as $4 million for the military-civil air navigation development and $11 million for establishment of air-navigation facilities.

► **CAA Salaries**—One high official outside CAA says paring the $108-million CAA salaries and expense item definitely will curtail some administration functions.

Previous cuts made in CAA's budget already have reduced personnel. The official notes that maintaining any 24-hour staff operation, such as safety inspection or physical facility, like an airway or tower, requires a minimum of five men just to keep the operation staffed continuously by one man. This is because of the eight-hour shift, 54-day week, annual vacations and sick leave drain.

Each item of major additional equipment added to a facility requires at least one more man. CAA already is pared down to general minimums on many of its essential services, an official says; therefore the Budget Bureau is told it probably will have to cut out whole CAA functions in order to get any appreciable cuts in 1953-54 expenditures.

Proposed CAA Spending for 1954

(All figures in millions)

Not yet contracted (from prior year and new authorizations):	
Salaries and expenses	$108.1
Establishment air navigation facilities	10.6
Technical development	1.2
Operation Washington Airport	1.3
Construction Washington Airport	0.5
New Washington Airport program	1.4
Federal-aid airport program	4.8
Maint. & oper. Alaska Airport	1.0
Construction Alaskan airports	1.2
Air navigation development	4.3
To liquidate contracts:	
Establishment air-navigation facilities	9.5
Federal-aid airport program	30.2
Air navigation development	0.7
Total	$174.8

PAA Switches to DC-3s

Failure of traffic to build up to expectations on Pan American World Airways' Brownesville-Tampico-Mexico City route has caused PAA to replace the 54-70 seat Constellation it put on the run last October with 21-passenger DC-3s.

Flight frequency has been increased from four times weekly to a daily-except-Sunday basis.

Common Stock Returns on Investment of Domestic Trunklines 1938-52

	Average Stockholder Equity ($ Million)	Earnings For Stockholders ($ Million)	Stockholders' Return on Investment (per cent)
1938*	$20.7	(−$1.2)	6%
1939	26.9	3.4	13
1940	38.9	4.6	12
1941	48.9	4.0	8
1942	60.5	13.9	23
1943	78.3	12.8	16
1944	101.8	18.0	18
1945	129.4	16.3	13
1946	144.1	(−12.4)	(−9)
1947	128.1	(−25.2)	(−20)
1948	118.7	(−5.7)	(−5)
1949	148.6	17.0	11
1950	171.5	33.4	19
1951	215.2	46.6	22
1952**	250.3	33.6	13
Summary	$1,682.0	$159.2	9

* 1938 omits Colonial, Continental, Eastern and Northeast due to lack of comparable data.

** 1952 nine months to Sept. 30.

Note: Earnings for stockholders is residual income after federal income taxes and payments on preferred stock. This tally does not include surplus adjustments, which would increase stockholder earnings if shown, since many retroactive mail pay grants by CAB were reported not as income but as additions direct to the surplus account.

Source: Airlines' reports to CAB.

AA Calls CAB Rulings Political

Airline vice president says Board decisions are not based on fact; implies need for abolishing agency.

American Airlines' public attack on the basic concept of an independent board to regulate the government-franchised airline industry has surprised Civil Aeronautics Board.

American's vice president, Miss Carlene Roberts, in a recent speech to the Wings Club in New York, challenged the CAB record, alleging that Board members generally have decided issues politically rather than on the basis of fact and long-range industry welfare.

Miss Roberts implied that the Republicans might well consider abolishing CAB and creating instead a single agency to set policy for all transportation, as urged by the Republican minority report on the Civil Aeronautics Act of 1938.

►**Opposes Trend**—CAB members of both parties and top CAB staff officials told AVIATION WEEK they could not understand the attack, because American has fared well under Board protection and regulation. Speculation is that American launched the new offensive as its defense against the Board's trend to grant more competitive route franchises, now that modern aircraft efficiency enables trunk airlines to make profits without subsidy.

Miss Roberts' speech was timed with AA's announcement of a $12.5-million net profit for 1952.

Some CAB sources also said the American attack might tend to substantiate recent rumors of a Republican move to combine the Board with the Interstate Commerce Commission, which regulates railroads and trucking. The Hoover Commission on Government Reorganization strongly urged maintenance of an independent CAB.

Miss Roberts criticized CAB for:

• **Too many competitive route certificates.** "If policies are such that private management's success in building up traffic is met only with the agency's decision that there is enough traffic to warrant authorizing another airline service duplicating the service or services already there, it could be argued that the task of management should be one of avoiding the development of traffic."

• **Over-regulation of profits.** "If policies are such that the tight cost controls and efficient management which help to increase margins of profit are to be met only with the charge that profits are excessive, and are to be pared to the percentage on investment somehow deemed to be the magic percentage, it could be argued that the task of management should be one of avoiding cost control and efficiency."

• **Certificating nonscheduled airlines** that operate on a schedule. "If policies are such that a course of winking at regulations finally will be rewarded by legalizing the illegal, it could be argued that the task of management should be one of ignoring the rules of the game whenever it seems expedient. . . ."

Miss Roberts said the domestic trunklines earned only 2.9% on their investment during the postwar period up to the end of 1951. She implied that CAB should have guaranteed enough profit (by higher subsidies and less competition) for the airlines to meet cost inflation and pay adequate dividends at the same time.

"If we make a profit of $12-½ million a year, this means it would take eight years' profits just to make up for the inflation in airplane prices, not to speak of the need for funds to pay dividends to stockholders and put aside something for a rainy day," she said.

CAB members and officials recalled that American Airlines stockholders have averaged a 16% annual return on their investment in the 14 years of CAB regulation. Stockholders of the trunk airlines, as a group, have averaged a 9% return since 1938, the CAB officials said, and an 8% return since 1945, with higher earnings some years offsetting three years of heavy losses.

AA Stockholder Return On Investment

1938	31%
1939	88
1940	33
1941	26
1942	32
1943	21
1944	22
1945	9
1946	(−3)
1947	(−16)
1948	(−24)
1949	27
1950	36
1951	26
1952*	24
Summary	16

* 1952 12 months ended Sept. 30.

Note: Computation and source same as trunkline table.

PNA Plans Buildup Of Alaskan Routes

Pacific Northern Airlines, Inc., plans a second daily roundtrip flight on the 1,580-mi. route between Portland, Seattle and Anchorage via Juneau when it buys two secondhand DC-4s soon to add to the two it now operates on a daily nonstop flight to Anchorage.

With the additional aircraft PNA also will extend its intra-Alaskan service to Juneau, Yakt and Cordova. Pacific Northern now flies from Kodiak and King Salmon to Juneau through Anchorage with four DC-3s and a six-passenger Lockheed 12A, which operates into airports which are too small for DC-3s.

Territory served by the airline is inhabited by 70% of the territorial population. Since it was organized in 1932, PNA has flown 135 million miles without a fatality.

Civil Aeronautics Board granted the U.S.-Alaskan route to PNA in October 1951.

That year the airline's total income was $1,017. Net income for first 10 months of 1952 amounted to $245,569.

United Opposes NWA Routes in Northwest

United Air Lines has contested recommendations of a Civil Aeronautics Board examiner for Northwest Airlines service between Portland, Seattle and Spokane without approving UAL Seattle-Spokane routes and flights east.

In objections filed with CAB recently, United says public benefits of a UAL Seattle-Spokane service substantially would outweigh those of the NWA route proposed by CAB examiner F. M. Ruhlen.

The carrier contends Ruhlen failed to recognize the importance of Spokane as one of the major cities of the West Coast and its need for additional service of competitive airlines.

UAL also objected to the examiner's recommendation for a Western Air Lines shuttle between Portland and Seattle, claiming need for the service was not supported by evidence.

Convertiplane Group Plans Policy Report

The Air Coordinating Committee's new convertiplane policy working group has scheduled preliminary reports for the end of this month. ACC established the group last month (AVIATION WEEK Feb. 23, p. 70).

Purpose is to recommend a coordinated civil-military policy for development and regulation of convertiplanes. Initial reports the end of this month will be:

• **Background and historical.** The Army research staff of Col. William B. Bunker, chairman of the ACC group, will prepare a study of convertiplane development to date.

• **Commercial outlook.** Civilian members Richard Waldo of Civil Aeronautics Administration and E. B. Miller of Civil Aeronautics Board will report on airline and other commercial prospects of the convertiplane—market, economics and size of plane required. Air Transport Assn. economist Graham Aldrich recently forecast a potential of 28 million passengers in the 150-500-mile intercity route system, assuming that an economical 30-passenger convertiplane could be developed.

• **Military use.** The military members of the ACC group will meet independently this month to prepare an initial report on ideal military applications of the convertiplane. Members are Col. Bunker, Army; Lt. Col. R. L. Long, Army; Maj. R. J. Wellman, USAF, and R. S. Knecht, Navy.

• **Government policy trends.** The civilian members will report on past and present government policies of promotion and regulation of other analogous "inventions and innovations." CAA's Waldo was chairman of the recent "ACC Helicopter Working Group," which made a similar report recommending copter development and regulation policy.

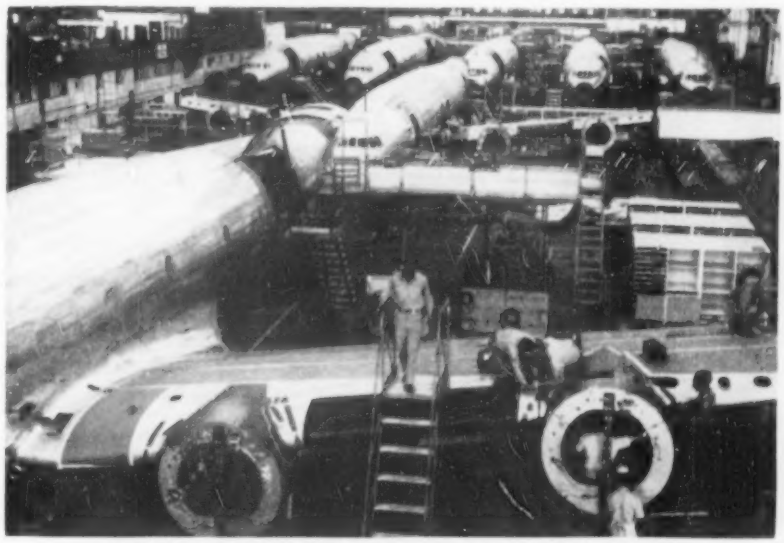
Members at this month's meeting will exchange these preliminary reports and lay groundwork for tackling the next assignment: technical study of convertiplane operating prospects. Much of this will be speculative, since none of the three military prototypes is reported to have flown, and all are only small-capacity experimental designs resulting from a recent design competition for "observation" planes. The Bell and McDonnell prototypes are scheduled to fly this year and the Sikorsky next year.

Final step will be recommending a policy on convertiplane promotion and regulation. Col. Bunker said the ACC report will be similar to that on helicopter policy, but also will borrow some analysis and prediction methods from the Port of New York Authority study of the commercial helicopter outlook.

Central Certificate Renewed to 1956

Central Airlines has won Civil Aeronautics Board renewal of its certificate to Feb. 19, 1956. The Board has refused to renew certificates of some other highly subsidized local service lines, but CAB in this case cites steady improvement in Central's traffic and load factor position.

The airline's original temporary certificate expired in 1950, but CAB deferred action on renewal decision until now. Central serves Oklahoma, north-



LOCKHEED SPEEDS SUPER CONNIE OUTPUT

Typical of the record-breaking pace Lockheed is setting on Super Constellation production is this scene showing seven fuselages on the assembly line, part of a large U. S. Navy order. The Burbank, Calif., firm is working on a $400-million Turbo-Compound Super Connie backlog. Quantities now on order and scheduled for production in the next three years nearly equal the total number of Connies built in the plane's 10-year history, says Lockheed president Robert E. Gross. Four different Super Connie types are on order, and total output will number more than 460 planes.

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JET ENGINE DIFFUSER CONE...produced by SOLAR AIRCRAFT COMPANY, San Diego, Calif., for use in J34 jet engines. Made from 18-8 columbium-stabilized stainless steel (AMS 5363) this casting replaced forgings, and resulted in greater economy plus superior dimensional stability of the part after machining. Diameter: 24 in —Weight: 200 lbs

NOZZLE DIAPHRAGM . . . used in aircraft engines at temperatures up to 1600°F. Produced by LEBANON STEEL FOUNDRY, Lebanon, Pa., this part is cast in chromium-nickel stainless steel (CF-8C alloy, approximately equivalent to Type 347 wrought material).

JET ENGINE RINGS . . . centrifugally cast by the DURALOY COMPANY, Scottdale, Pa., using 25% chromium—14% nickel—3% tungsten alloy. The center casting is a rough machined blank. The end castings are finished rings. These parts are used at temperatures of 600°-700°F., under highly oxidizing conditions. Diameter: about 15 in

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ern Texas and southeast Kansas areas.

Central gets about $1.5 million in subsidy each year, CAB estimates, with compensatory pay amounting to about $100,000 per year for carrying mail.

The Board denied Central's application for certificate renewal to serve Wewoka, Durant and Okmulgee, Okla.; Pampa, Greenville and Gainsville, Tex., and Winfield, Kan.

Central America Planning Own Airline

(McGraw-Hill World News)

Guatemala City—Formation of a Central American airline, owned jointly by the five republics, will be proposed formally by Guatemala next May at a meeting of the Organization of Central American States.

The new carrier would handle air service between Guatemala and the four other member states—Costa Rica, Nicaragua, Honduras and El Salvador—and on international routes out of Central America.

No details of the proposal have been made public, but government sources here say the "basic concept has been accepted favorably, although informally, by the other republics."

Central America is served internationally by Pan American World Airways, TACA International Airline and KLM Royal Dutch Airlines. The sources did not indicate whether restrictions would be imposed on the foreign-owned carriers if the proposed Central America airline is formed.

Single Pacific Airline Is Urged for Japan

Latest development in the battle of various Japanese interests for a trans-Pacific airline certificate is a request by Minister of Transportation Mitsujiro Ishii that three applicants consolidate to form one flag line. The Japanese government plans to invest one billion yen (approximately $2,777,778) and control 54% of the stock.

The three companies are Japan Air Lines, Japanese International World Airways, and Iino Steamship Co. (AVIATION WEEK Oct. 6, 1952, p. 84).

JAL operates Japan's domestic routes and has a contract with Transocean Air Lines for trans-Pacific operation. JIWA has a 10-year training, flight and equipment contract with California Eastern Airways. Iino has a contract with KLM Royal Dutch Airlines.

California Eastern vice president Fred Caton told AVIATION WEEK on his return from Tokyo that JIWA and Iino are agreeable to a consolidation, but JAL strongly is opposed. JAL, which already has exclusive Japanese government certificate and backing for domestic operation, apparently considers its position strong enough to hold out for an exclusive trans-Pacific franchise.

JAL general manager Ryohei Itow has announced that JAL plans to start trans-Pacific service (operated by Transocean) to San Francisco with two DC-6Bs about Apr. 10, charging the same fares as member airlines of the International Air Transport Assn.

Cargo Weight Boost Is Early Aim of TAG

Transport Air Group—new airfreight association—will ask the Civil Aeronautics Board soon to approve a 5% increase in certificated gross weight of DC-4, DC-6 and Constellation cargo flights.

The proposed weight boost previously was turned down by CAB despite strong support by airlines and the Aircraft Industries Assn.

The recently formed TAG has set up a Washington office, and manager L. R. (Mike) Hackney, former Lockheed cargo engineer, says a staff will be hired in the near future from a number of "outstanding" candidates. Address of the Transport Air Group is 720 Cafritz Bldg., 1625 I St., N.W., Washington, D. C.

Australia Planning Jet Liner Airports

(McGraw-Hill World News)

Melbourne—Special provisions for the handling of civil jet transports have been made in plans for new airports being planned by the Australian Civil Aviation Department.

First two airports earmarked for the new design are Essendon (serving Melbourne) and Mascot (Sydney), but no immediate construction is foreseen because of lack of capital appropriations.

Realizing that present loading procedures might endanger persons on the ramp, and create extreme noise with jet plane operations, officials envision a system which would obviate these difficulties.

► **How It Works**—Jet aircraft will land as they now do, but will taxi up a ramp to a special loading apron area. This area is to be level with the roof of the passenger lounge.

Once at this location engines are cut off and the plane rolled silently to chocks rising from the apron. With loading of passengers and freight completed, the aircraft coasts down a ramp to the taxiway, at which point engines are restarted without fear of injury to other passengers on the ramp or damage to material which is normally located in the area.

One apron with nine aircraft positions could handle 200 landings and takeoffs a day, Australian Director of Airports A. Hepburn believes.

To cut down noise, officials plan to build an earthwork ramp in front of the administration buildings.

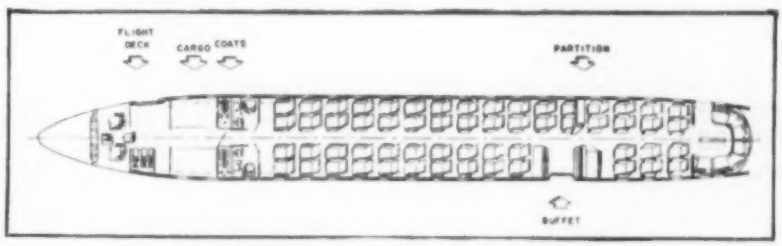
Frontier's Mexico Routes Are Renewed

Civil Aeronautics Board has renewed Frontier Airlines' Arizona-Mexico route segments acquired through merger with Arizona Airways. The Board granted the certificate extension "experimentally" until Mar. 31, 1955, when Frontier's main route system comes up for renewal consideration.

The Board states that "continuation of Frontier's present service would cost the government about $490,000 a year in mail pay support." The Board adds, "In view of the limited number of persons utilizing Frontier's service, a reduction in this mail pay obligation is obviously required."

The Board therefore dropped Phoenix-Lorsburg and Phoenix-Yuma service, but kept the other services. By 1955, CAB said, a final decision should be possible.

Frontier's total route subsidy for fiscal 1954 is estimated by CAB at about $2½ million.



SEATING PLAN FOR UAL'S DC-7

Diagrammatic layout of seating arrangement United Air Lines plans for its new Douglas DC-7s. There will be 58 seats plus a semi-circular lounge at the rear of the cabin. Seating is two abreast. UAL has ordered 25 DC-7s and expects to get first deliveries next year. The plane will be powered by four Wright Turbo-Compound engines.

SHORTLINES

► **American Airlines** fleet by July will include 78 Convairs, 50 DC-6s, 25 DC-6Bs, 13 DC-4 freighters (six on Pacific airlift), one DC-4 military passenger charter plane, and 3 DC-6A freighters. Company has ordered 25 DC-7s for delivery after July.

► **Bonanza Air Lines** offers radio-telephone service for airborne passengers.

► **Braniff Airways** reports average pilot captain age is 40 on domestic flights, 45 on international.

► **British Overseas Airways** will begin jet Comet service once weekly from London to Tokyo Apr. 3, cutting two days from present Argonaut time of 80 hr.; new time is 33¼ hr. (26¼ in air).

► **Chicago & Southern Air Lines** merger with Delta goes before stockholders for approval at special meetings in April.

► **Civil Aeronautics Administration** supervised training of 94 nationals of 32 countries in 1952, sponsored by various U. S. and international agencies.

► **Cordova Air Service** has CAB approval for a $100,000 RFC loan.

► **Delta Air Lines** has started its first night aircoach, using Convair-Liners. Atlanta-Dallas coach via Birmingham, Jackson and Shreveport began Mar. 1.

► **Eastern Air Lines** has filed its fifth annual first-class, 16-day summer excursion fare to Florida; New York-Miami is $132, approximately 21% less than regular roundtrip.

► **Flying Tiger Line** has completed an airfreight station at San Diego.

► **International Air Transport Assn.** trans-Atlantic coach fares are expected to be the same this year as in 1952. IATA decision is subject to approval of individual governments.

► **New York International Airport** $3-million construction on hangar, shops and offices has received materials priority approval.

► **North Central Airlines** 25,235,332 revenue passenger-miles in 1952 were 65% more than a year ago. Passengers totaled 153,047, a gain of 58%.

► **Pacific Northern Airlines** U. S.-Alaska traffic in January gained 67% from a year ago. System passenger traffic gained 49% to 2,550,000 passenger-miles. Company predicts the three winter months will top last year by 65%.

► **Pan American World Airways** started daily trans-Pacific service Mar. 1. Tokyo flights increased from four to five a week; there are two flights per week to Manila. All services connect with flights east to Hong Kong, Singapore, Bangkok, Rangoon, Calcutta, New Delhi and around the world, and with flights west to Australia and New Zealand. PAA flies its trans-Pacific route with Boeing Stratocruisers. . . . Company's unilateral move to cut bulk trans-Atlantic cargo rates Nov. 15 proposes 35 cents a ton-mile for bulk lots of more than 1,100 lb., compared with current rates of 48 cents for shipments of more than 100 lb. A bulk shipment under the proposed rate would cost 60 cents per lb. New York-London, compared with present $1.10.

► **Railroad and Airline Wage Board,** folding shop soon, has moved to Federal Security Building, South, 3rd and C Sts., S. W., Washington 25.

► **Slick Airways** has asked CAB permission to haul air express, now prohibited by Slick's certificate. Passenger lines and an express agency have ignored CAB instructions of 1948 to change contracts, and Slick express operation would show the Board how contract changes would affect airline express business, the carrier argues.

► **Southern Airways** carried 122,000 passengers in 1952, 26% more than 1951.

► **Sabena Belgium Airlines** reports 1952 passenger volume up 22%, with outlook for 1953 "even better." Company has eight DC-6Bs (six in coach configuration) and two DC-6A airfreighters slated for delivery this year.

► **Seaboard & Western** reports 688,762 revenue-miles flown in January, up 10% from a year ago, with daily utilization up from 13 hr. to 14 hr.

► **Trans-Texas Airways'** Segment 2 of Route 82 is recommended for renewal, in revised form, to Mar. 31, 1954.

► **Western Air Lines** asks CAB for direct Denver-San Francisco service and Denver-San Diego via Phoenix.

► **Wien Alaska Airlines** has joined Ocean Van Line of Seattle, operating ocean-rail-air cargo service connecting Seattle with 69 cities and towns in northern Alaska. A one-charge bill includes pickup and delivery, warehousing, handling and cargo insurance, wharfage, and transport and delivery from final carrier to customer.

WHAT'S NEW

Telling the Market

Conveyer Terms and Definitions is a standard nomenclature manual containing some 1,500 listings in several languages. Line drawings of more than 80 types of conveyers are included. The 64-page manual is intended for users and makers of this type equipment and is available from the Conveyer Equipment Manufacturers Assn., No. 1. Thomas Circle, Washington 5, D. C.

Data on research facilities of Cook Electric Co. is contained in Bulletin R 10. Work in nuclear physics, servomechanisms, upper-air research, weather reconnaissance, radar, sonar, guided missiles and general electronics is encompassed. Write the firm at 2700 Southport Ave., Chicago 14.

New Addresses

Kimball & Gill, aviation consultants, have moved their offices to 118 Main St., Tarrytown, N. Y. Former address was 400 Benedict Ave., Tarrytown. Phone number, Tarrytown 4-4444, remains the same.

John Hewson Co., N. Y. C., has opened offices in Chicago at 6349 No. Western, and has appointed Robert H. Metz, Jr., district manager. The firm makes high-speed static controls, test instruments and warning systems.

Raymond C. Crippen Research & Development Laboratories have moved their offices and facilities to 1138 E. North Ave., Baltimore 2, Md. Phone is Belmont 6858.

Aircraft Trade Shows, Inc., has moved to Suite 697, Hotel McAlpin, Broadway and 34th St., New York 1.

Reliance Electric & Engineering Co., Cleveland, Ohio, has moved its Newark, N. J., sales office to 535 High St., Newark. Previous location was 1060 Broad St. Phone number, Market 2-6176, remains unchanged.

Publications Received

• **Aerodynamics of Propulsion,** by Dietrich Kuechemann and Johanna Weber, published by McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36, N. Y., 1953, $9.00. This text describes recent developments in a new branch of aerodynamics dealing with the problems of propulsion. It is intended for aeronautical or mechanical engineering students, engineers in the aircraft industry and research field.

• **Aircraft Instrument Design,** by W. H. Coulthard, published by Pitman Publishing Corp., 2 West 45th St., New York 36, N. Y., 1952, $7.50. The author explains and illustrates the basic principles on which precision design depends.

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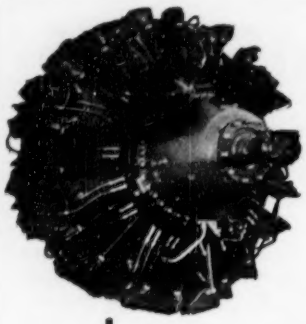

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75	1195-4-A	Eclipse	Vibrator
80	DW-28	Eclipse	Transformer
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75	1416-12E	Eclipse	Starter
100	716-3A	Eclipse	Generator (NEA-3A)
384	564-2A	Eclipse	Oil Separator
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22	77C5	Lewis	Carb. Air Temp.
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30	47B21	Lewis	Free Air Temp.
33	47B22	Lewis	Air Temp. Gauge
28	47B23	Lewis	Air Temp. Gauge
54	47B24	Lewis	Air Temp. Gauge
22	906-6-011	Kollsman	Diff. Press. Gauge
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33	DW-47	Eclipse	Transformer
46	117-47	Edison	Fire Detecter Control Box
19	117-10	Edison	CO2 Cylinders
345	981280	Kidde	Interconnector
43	966090	Kidde	Pressure Control
104	966679	Kidde	Tee
225	981591	Kidde	Switch
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47	M870036B	Kidde	Oxygen Cyl.
74	923748	Kidde	Valve
326	982585	Kidde	Valve
325	AN60009-1B	Oh. Chem.	Valve
247	AN6009-2A	Oh. Chem.	Valve (3000 PSI)
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115	P4CA2A	Parker	Restrictor Valve
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123	PI2-2546-76	Parker	ConeCheckValve
620	PL2-2546-77	Parker	ConeCheckValve
540	PL2-2546-78	Parker	Restrictor Valve
142	SP4-2746-76	Parker	Check Valve
112	PLY-843-54	Parker	Check Valve
23	PL2-1846-77	Parker	
120	MF9-713-15A	Vickers	Hydraulic Pump
124	PF12-713-25BCE	Vickers	Hydraulic Pump
10	PF9-2713-20Z2	Vickers	Hydraulic Pump
327	Pf4-713-20BCE	Vickers	Hydraulic Pump
57	MF45-3911-20Z	Vickers	Hydraulic Pump (3000 PSI)
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70	AN3213-1	Scintilla	Ignition Switch
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126	17322-2	Fenwall	Thermo-Switch
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52	M68EG	Bendix Radio	Mount
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626	CR2792F101-A3	G.E.	Relay
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31	5AM31JJ9A	G.E.	Amplidyne
111	5AM31NJ10	G.E.	Amplidyne
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189	5PD65-MB1	G.E.	Motor
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45	D2060	C. P. Clare	Relay
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50	AN6213-2	Bendix	Hyd. Valve
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1175	RS-2	Mallory	Selector Box
172	A7012	Delco	Motor
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200	2222-1F-2A	Eclipse	Tachometer Indicator
28	AN5770-2	Manning Maxwell Moore	Manifold Pressure Gauge
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"Flying Saucer" reports still pop up in press and letters to AVIATION WEEK. . . . Some Britishers think **Pan American** may get its first Comet before the advertised "late 1956," if the manufacturer can step up its schedules. . . . **The Soviet,** through Pravda, has launched a high-powered propaganda campaign against revival of West German aircraft and airline industries, counting on French fears of a militarily powerful Reich and British apprehension over new competition. Pravda is trying to convince the West Germans that their air industries can only be rebuilt with funds raised through heavy taxation, and by giving great power to former Nazi militarists and monopolists.

. . . **Vickers Viscount** now in Canada will not be brought to the states; it's scheduled for cold weather tests at Winnipeg and de-icing trials at Montreal, conducted by TCA engineers. . . . Another Viscount may make a U.S. tour later this spring. . . . It probably hasn't been published in England but when **Queen Elizabeth** took over the left seat of the Comet on her flight she pushed the ship up to Mach .8. Comet's average cruise speed is .72 and maximum is set at .77, although Comets have flown at .85 without control difficulties. Every production ship is test-flown at .81.

. . . The **executive aircraft fleet** in the U.S. is growing fast. An official of Corporation Aircraft Owners Assn. says its members total 240 firms, which own more than 1,000 planes, and that the average member has an annual operating budget (direct costs) of $200,000, or about $48 million. He contends that at present and future purchasing needs of business planes are not realized by other aviation interests, including equipment makers. "We can offer a bigger market for DME equipment, for example, than all the airlines put together," he says. . . . The lead article in the Mar. 7 **Saturday Evening Post,** "Seven Who Survived," was written by Lee Moore, AVIATION WEEK's transport editor. . . . Among many problems the new **CAA administrator** must tackle is replacement of a regional administrator notoriously unstable.

. . . One of the country's top air safety authorities says **NACA's series** of crash fire tests will bring incalculable benefits, with much data already released to industry and military, and more to come.

. . . Numerous **air observers** back from Korea have expressed opinion that the U. S. press overplays fighter combat and underplays the job the crews of the old bombers are doing. However, Col. A. A. Arnhym, just back from six weeks in Korea as observer for Air Research & Development Command's Directorate of Armament, says "I believe the fighter pilots are entitled to all the publicity they are getting, but there is frequently more excitement, flying skill and courage involved in other types of missions. For sheer courage, the pilots of the T-6 "Mosquitoes" don't have to yield to anyone. They carry no armament, have no means of defense, yet they circle for long periods under constant and often heavy enemy fire.

. . . Should medium-sized cities now without airports consider building **heliports instead** to save heavy airport construction and maintenance costs? James Buckley, of the New York firm of aviation consultants, James Buckley, Inc., says they will start such a study this spring. . . . Lee Willis of **CAA's Information Department** in Washington has been assigned full time to public and press relations for the controversial Office of Aviation Safety. **Bill Cunningham,** deputy regional administrator from Fort Worth, has been brought to Washington for three months to occupy the job of deputy director of OAS, recently vacated by William Davis. Ernest Hensley, OAS director, told AVIATION WEEK other field men will be brought in for two or three months each, after Cunningham's stint. . . . North American **nonsked** carriers are meeting scheduled coach competition by advertising N. Y.-California fares of $88, and $72 for the return portion of a roundtrip ticket. Miami is $39 and $35.10 on the same basis. . . . **Temco's T-35** Buckaroo went through three rocket-firing tests the other day, firing two, three, and 10 rockets respectively, all described by a company spokesman as successful.

. . . In England **ground mechanics'** morale and discipline are buoyed up by the Society of Licensed Aircraft Engineers, which amounts virtually to a professional association. Such an organization here probably would be impossible because of union fears of competition. . . . Almost every **British operator and industry spokesman** these days speaks of the happy partnership between the nationalized transport corporations, the Ministry of Supply, and the aircraft industry. "This partnership is invariably given credit for the present lead in British civil jet developments," writes Nat McKitterick, our British correspondent.

The Bystander

AVIATION CALENDAR

Mar. 10-11—Eleventh Annual Conference, Society of the Plastics Industry Canada, Inc., General Brock Hotel, Niagara Falls, Canada.

Mar. 12-13—Second annual meeting Southwest Conference on Feedback Controls, sponsored by IRE, AIEE, ASME and Southern Methodist University. SMU, Dallas, Tex.

Mar. 16-20—SAE semi-annual meeting of aeronautical materials specification group, Stoneleigh Hotel, Dallas, Tex.

Mar. 17-19—121st National Meeting American Meteorological Society, Chalfonte Haddon Hall, Atlantic City, N. J.

Mar. 17-20—21st Annual Meeting, American Society of Tool Engineers, Hotel Statler, Detroit.

Mar. 23-25—Third Midwestern Conference on Fluid Mechanics, University of Minnesota, Minneapolis.

Mar. 23-26—Institute of Radio Engineers National Convention, Waldorf-Astoria and Grand Central Palace, New York, N. Y.

Mar. 23-27—Eighth Western Metal Exposition and Congress, Pan-Pacific Auditorium, Los Angeles.

Mar. 23-28—Congress of Civil Aviation Conference, a joint meeting of trade organizations; Theme: 50 years of aviation progress. Airport Operators Council and American Assn. of Airport Executives are holding annual meetings simultaneously. Kansas City, Mo.

Mar. 25-27—National Production Forum of the SAE, Hotel Statler, Cleveland, O.

Mar. 31-Apr. 2—First International Magnesium Exposition, National Guard Armory, Washington, D. C.

Apr. 20-23—Aeronautic Production Forum, National Aeronautic Meeting and Aircraft Engineering display (SAE), Hotel Governor Clinton and Hotel Statler, New York, N. Y.

Apr. 20-May 2—Annual Conference of Technical Committee, International Air Transport Assn., Caribe Hilton Hotel, San Juan, Puerto Rico. Helicopter Symposium will be a principal feature.

Apr. 25-May 2—First annual National Transcontinental Handicap Air Cruise for private planes of 300 hp. or less, Philadelphia to Palm Springs, Calif., sponsored by Philadelphia Junior Chamber of Commerce.

May 6-7—Second annual Skylady Derby, sponsored by Women's National Aeronautical Assn., sanctioned by NAA and conducted under FAI rules. From Fort Smith, Ark., to Memphis, St. Louis, Kansas City and return to Fort Smith. WNAA's twenty-fourth annual convention will follow at Fort Smith.

Sept. 7-13—1953 SBAC Coronation Year Flying Display, Farnborough, Hampshire, England.

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11—(top, bottom) Howard Levy; (center) McGraw-Hill World News; 25-26—Doman Helicopters, Inc.; 28-29—Defense Department; 32—General Electric; 55—United Air Lines.

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EDITORIAL

The Executive Bottleneck

Consolidated Vultee Aircraft Corp. is preparing its men to take on bigger jobs.

The task of training capable executives is necessary in many industries. In the aircraft field where it should be considered imperative, such training has been conducted mainly under nightmare conditions of furious war expansion. Convair's Fort Worth Division, however, announces expansion of an executive development program that it started last year.

Convair is introducing an "interne" plan whereby observers will be invited to sit in on executive committee meetings to "expose men of Convair management to overall division objectives, to the basic factors and considerations on which division actions are based, and to the approach taken to arrive at decisions for such actions," says August C. Esenwein, division manager.

Under this plan, observers invited to the meetings may be given special assignments by the executive committee.

Another phase of the development program will be initiated shortly when 11 men in positions of superintendent and above will be rotated in their jobs so they can become familiar with various operations in aircraft manufacturing outside of their particular specialty. They will be given special training in communications, as well.

"In this day of specialization," Mr. Esenwein says, "we too frequently are prone to become experts in our own little field and fail to understand the broad, overall operation. This executive development program is aimed at correcting just that."

We commend the Fort Worth Division's modest plan, and hope it will be adopted and expanded throughout the company and elsewhere in the industry.

The mistakes and lessons of those awful days of World War II, when the industry was mushrooming at fantastic rates, were studied carefully after VJ Day by a research group from the Graduate School of Business Administration at Harvard. Their report, "Problems of Accelerating Aircraft Production During World War II," was published in 1946. These experts pointed out that top executives in many aircraft companies were "overwhelmed by day-to-day decisions and hence were unable to provide the necessary leadership."

As managements gained experience in the operation of large-scale organizations, more decisions were made at lower levels and top executives were able to do more forward thinking.

"Not until late in the war, however, were most managements able to anticipate problems and to set up definite programs to meet them," the report said.

The investigators found that "in a very real sense management problems . . . constituted the ultimate limiting factors on the peacetime aircraft industry's ability to expand during the war.

"These limitations were not so tangible and easy to understand, say, as a shortage of plant space or of aluminum forgings, nor could they be satisfactorily measured. Nevertheless, when the companies were forced overnight into the vast wartime expansion, they could progress only as fast as the upgraded and outside management personnel could learn their new duties. . . .

"When the war forced the upgrading of most management personnel, it was found that many possessed abilities which had, up to that time, been unused and frequently unsuspected. Everything considered, their performance was unexcelled. . . ."

The report referred specifically, among management problems which were described as production bottlenecks, to "the failure to train industry personnel in peacetime to assume more responsible management positions." This delaying factor, the specialists concluded, "could have been reduced by training courses for the lower ranks of management and by rotation of executives between various departments in order to broaden their experience."

This, apparently, is what Convair hopes to do.

Airports, Life & Death

It probably surprised New Yorkers to learn from Howard S. Cullman, chairman of the Port of New York Authority, that Queens' two major airports alone, La Guardia and Idlewild, support 15,535 persons, with payrolls of $76 million a year. By 1956 there will be 36,000 jobs, paying $160 million. If Newark Airport is added, the 1952 employment total for the three is 16,414 and the payroll $80 million. By 1965 there will be a total of 42,000 jobs, paying the citizens $190 million a year.

Those three "public liabilities" seem also to keep quite a sizable number of citizens **alive**, don't they?

Bureaucratic Bungle de Luxe

Business Week magazine looses an editorial accusation of "bungling" at the Federal Communications Commission for frittering away 21 months "making up its bureaucratic mind" on an important application from industry.

The magazine's editorial sees it this way:

"Leaving entirely out of the question the merits of the decision, the fact that the commission took almost two years merely to reach a decision forces the inescapable conclusion that the commission and its staff as a whole are either callous to the welfare of business enterprise or supremely incompetent. They may easily be guilty on both counts. President Eisenhower's Administration is pledged to end this type of muddling inefficiency. It would be a salutory thing if the new Administration were to move promptly to make an example of the FCC and to instruct other regulatory bodies that their business is to regulate and not to ruin."

The FCC is a piker in dawdling. We refer Mr. Eisenhower to Civil Aeronautics Board. This past week it re-opened all over again hearings on the trans-Atlantic Middle East air cargo case. Seaboard & Western Airlines filed its application for this route just about 68 months ago—or five years and eight months back. A decision is still a long way off.

The radio industry is lucky.

P. S. The British Ministry of Civil Aviation on Feb. 13 approved an application of Airwork, Ltd. (more competition from abroad) to fly scheduled freight between London and the U. S. The decision came less than a year after Airwork filed its request!

—Robert H. Wood

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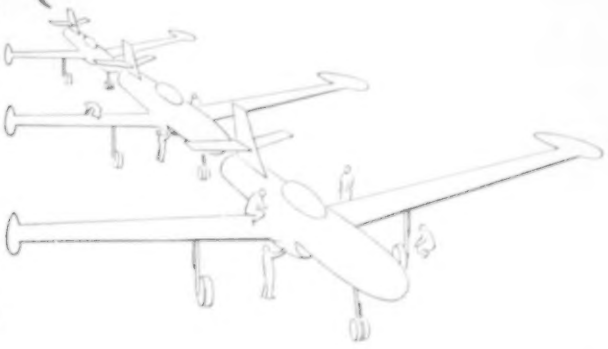

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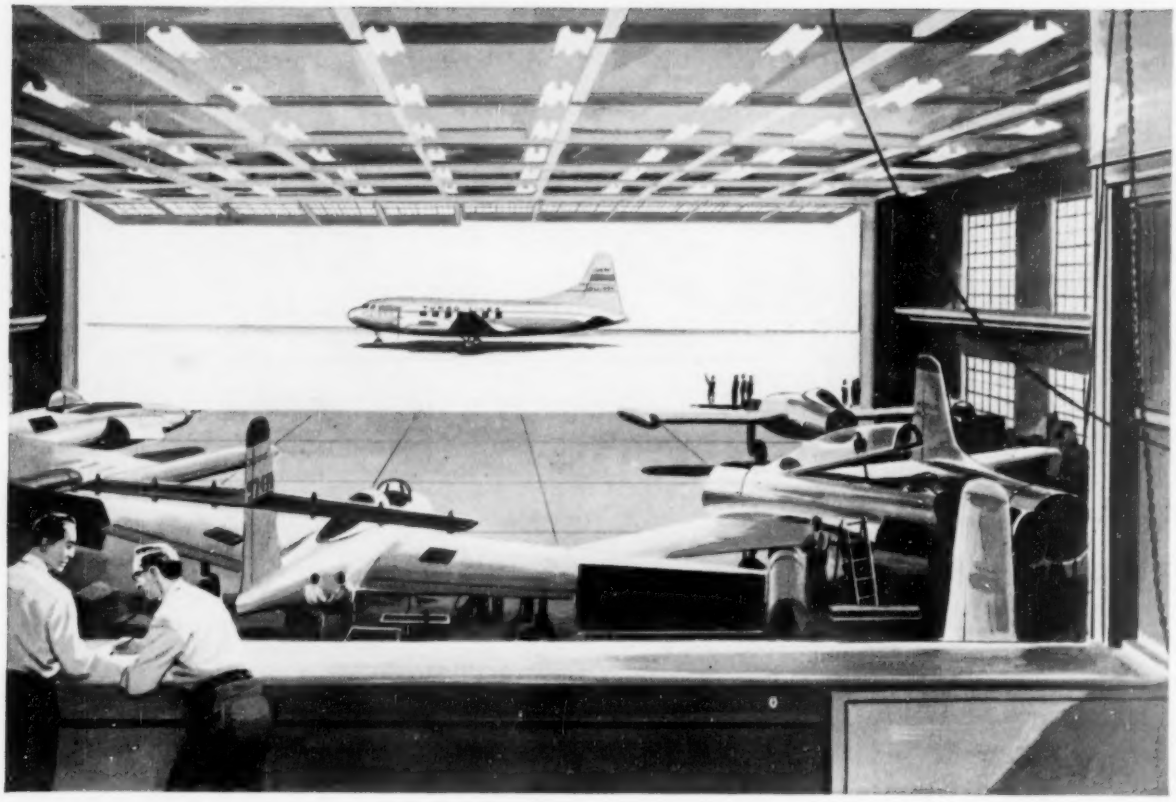

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